OIL AND GAS JOURNAL

1938

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The Oil and Gas Journal

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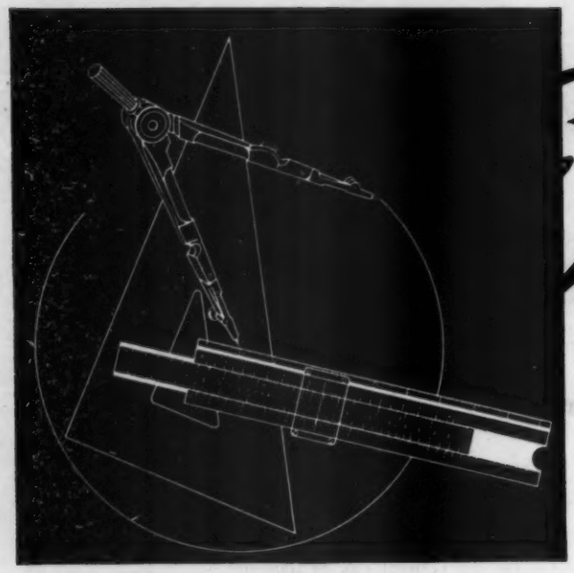

THERE ARE THE *Engineering* REASONS

Why the Baker BALL TYPE Valve (used in Baker Cement Guiding, Floating, Cementing Equipment) IS THE FIRST CHOICE OF MODERN OPERATORS

CORRECT DESIGN

The present design of the Baker BALL TYPE Valve didn't "just happen"—it represents the sum total of specialized knowledge and experience gained over a period of years in the development and manufacture of back-pressure valves for floating and cementing casing.

As shown in Figure 1, the Valve Chamber is so designed that the buoyant Bakelite Ball has only a short vertical distance to travel in order to seat against the resilient Rubber Ring (backed by Bakelite and Concrete). The Baker BALL TYPE valve action is not dependent upon springs, stems, or other mechanical devices. Instead, the Ball is operated instantly and automatically by positive *natural* forces to provide a perfect seal.

Thus, when running in, the differential hydrostatic pressure holds the buoyant Ball tightly against the Rubber Ring to form a positive, leakproof seal (see Figure 3). During cementing operations, the Ball rests on the three blunt, rounded, supporting fingers of the Valve Stop. (Figure 4).

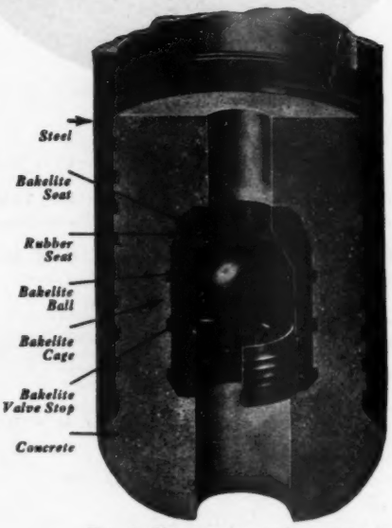

Fig. 1. Showing internal construction of the Baker Cement Float Shoe.

NO MECHANICAL OBSTRUCTIONS

There are no sharp or projecting mechanical obstructions (such as spring or valve stem) to interfere with instant and positive action of this BALL TYPE Valve. While floating in casing, the valve *always* closes, and remains closed. When circulation is started, the Ball moves away from its seat (see Figure 1) and takes its position resting on the fingers of the Valve Stop. No mechanical means are needed to guide the Ball to its seat—no fragments or other debris can be lodged to prevent positive sealing—no abrasion of the smooth spherical surface will prevent a complete seal against either high or low back-pressure.

FOR FULL DETAILS concerning the BALL TYPE Valve used in all Baker Cement Guiding, Floating, Cementing Equipment, see the Baker Section of your 1938 Composite Catalog—or write for your own copy of the individual Baker Catalog.

Fig. 2. Here is the Bakelite BALL TYPE Valve used in all Baker Floating Units.

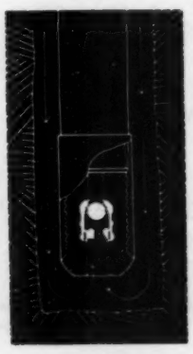

Fig. 3. Showing Bakelite Ball seated.

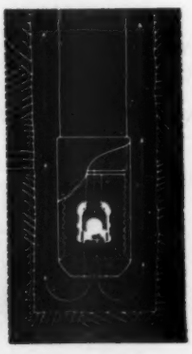

Fig. 4. Bakelite Ball unseated during cementing.

The BALL TYPE Valve is an EXCLUSIVE BAKER Feature

Before Baker adopted the present BALL TYPE Valve as standard in its Guiding, Floating, and Cementing Equipment, a number of types and designs of valves and valve assemblies were experimented with. In fact, the original Baker Float Shoe, manufactured in 1923 had a cast iron "poppet type" valve. During the refinement of the Baker Float Shoe, cast iron as a material, and the "poppet type" valve, were discarded in favor of non-metallic materials which resulted in the greatly desired Drillability feature and the BALL TYPE Valve which resulted in greater Valve Efficiency.

Today the Baker BALL TYPE Valve is an *EXCLUSIVE* Baker Feature and is ONE outstanding reason for the widespread preference for Baker Cement Guiding, Floating, Cementing Equipment among modern operators who demand the advantages of VALVE EFFICIENCY, DRILLABILITY AND STRENGTH.

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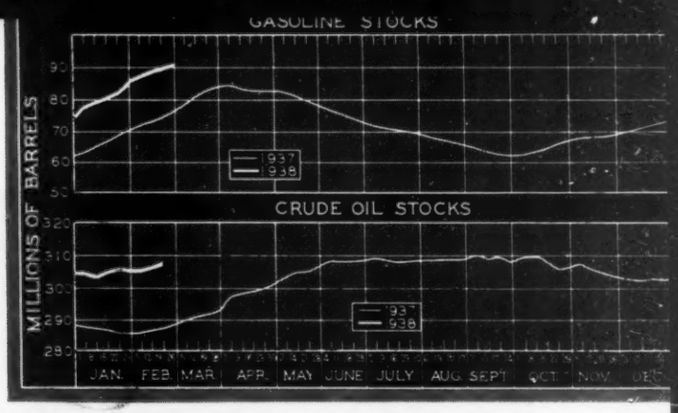


California Joins in Reduction

THE crude oil situation was given some measure of relief by the action of conservation bodies in Kansas, Oklahoma, and Texas and by a promise of voluntary proration by California oil producers. Kansas' production allowable was set at 169,528 barrels per day, a reduction of only 6,872 barrels from the February figures. Oklahoma allowable was cut temporarily to 475,000 barrels per day, a 25,000-barrel reduction, which was a disappointment to some crude purchasers whose wants could be filled by a production of 450,000 barrels per day. The Corporation Commission's action may be revised at its next meeting on March 7. The one-day-a-week shut-in in Texas will be continued through March, and a top allowable of 1,300,506 barrels per day was fixed by the Railroad Commission. California producers finally awoke to the danger of excessive overproduction and agreed to cut daily crude output 100,000 barrels per day at critical points, especially in the Wilmington field, Los Angeles Basin, where wells last week produced an average of 290 barrels per day per well. The Louisiana authorities did nothing to help, as the allowable in that state was increased slightly over 2,000 barrels per day.

CRUDE PRODUCTION *3,325,447 barrels daily average—down 42,795 barrels.*

CRUDE STOCKS *305,219,000 barrels as of February 19—up 304,000 barrels.*

GASOLINE STOCKS *90,719,000 barrels as of February 26—up 945,000 barrels*

REFINERY RUNS *3,170,000 barrels daily week ending February 26—up 20,000.*

Total production in the United States last week was reduced 42,795 barrels per day, bringing it down almost to the total of three weeks ago, and down to where it was early in March, 1937, when the demand for crude was large and steadily increasing. The peak came late in August with an average daily output of 3,735,393 barrels. Then the recession set in and has continued, reducing the demand for oil over 400,000 barrels per day in six months.

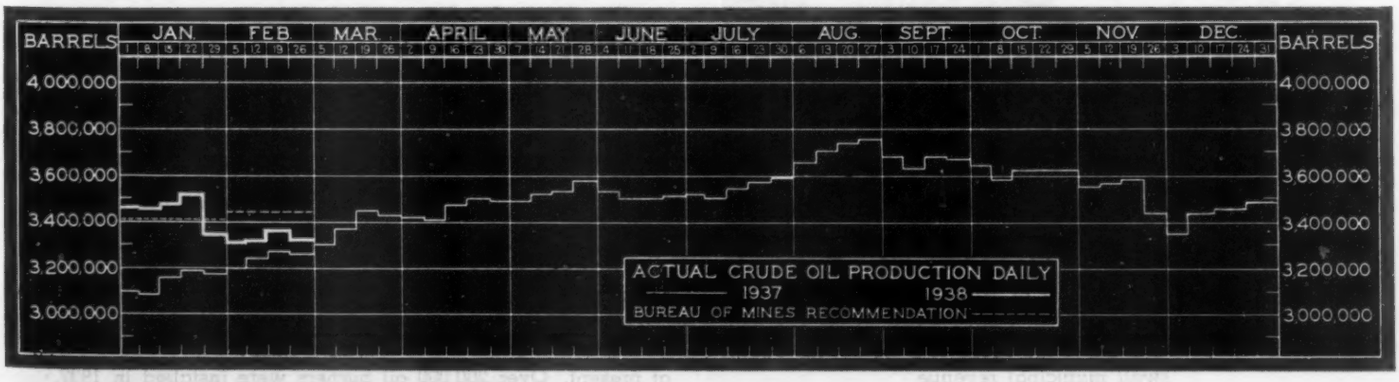
The outstanding news of the past week in field developments was the completion of three wells in the Ramsey pool in Payne County, Oklahoma, which produced for four hours at an average rate of 11,526 barrels per well per day, and the discovery of Ordovician production in a test in Callahan County, Texas, east of the Permian Basin.

Although demand for the highest-gravity distillates is holding the heating oil market fairly steady in some interior areas, overheavy stocks resulting from mild weather are causing concern. On the East Coast price reductions were announced this week. With the approach of spring a somewhat better feeling is observable in the gasoline market, but the record-breaking stocks continue to present a grave problem. Refinery shutdowns in the East Texas district along with the one-day-a-week shut down of wells, have exerted a pronounced effect upon motor fuel and natural gasoline.

Daily Average Production for Week

	Feb. 26 1938	Bur. Mines Feb. est.	Feb. state allowables	Feb. 19 1938
Oklahoma City	101,975	.....	.....	117,200
Fitts	58,275	.....	.....	65,025
Remainder of state	331,325	.....	.....	350,075
Total Oklahoma	491,575	569,700	500,000	532,300
East Texas	426,000	.....	.....	425,048
West Texas	179,698	.....	.....	178,650
North Central Texas	90,546	.....	.....	90,446
Texas Panhandle	62,354	.....	.....	71,897
East Central Texas	89,147	.....	.....	89,898
Gulf Coast Texas	302,653	.....	.....	299,504
Southwest Texas	99,097	.....	.....	100,398
Total Texas	1,249,495	1,365,700	1,200,000	1,255,841
North Louisiana	79,555	.....	.....	77,085
Gulf Coast Louisiana	178,600	.....	.....	176,700
Total Louisiana	258,155	239,400	244,700	253,785
California	746,200	693,700	693,700	740,250
Kansas	171,150	176,400	176,400	178,800
Arkansas	46,800	36,800	.....	48,070
Eastern fields	139,600	130,000	.....	138,600
Michigan	51,672	52,800	.....	50,846
New Mexico	105,100	105,100	101,100	105,090
Rocky Mountain area	65,700	68,600	.....	64,660
Total United States	3,325,447	3,438,200	.....	3,368,242

Decrease, 42,795 bbls. daily.



SPARKS FROM THE NEWS

A HOUSE DIVIDED

The hearing at Washington on ownership of submerged oil lands disclosed the same lack of coordination or understanding between government departments that was exposed in the Madison incident.

POUNDS PER MILLION

The vastness of the East Texas field is emphasized by engineering reports showing the decline in bottom-hole pressure in terms of "pounds per million barrels withdrawn." For the past year the decline has been about one-third pound per million.

STARTER

With just the money collected as gasoline taxes and diverted from use on roads the country could make a good start on Senator Bulkley's 8-billion-dollar proposed superhighway system.

OIL BOON TO TAXPAYERS?

Acme

Wells on city property along the docks of Long Beach, Calif., swell municipal revenue

WHEELS WITHIN WHEELS

This surely is becoming a complicated world when a reported sale of oil by the Mexican government to Japanese is discussed as a possible factor in the Mexican wage controversy with foreign oil companies.

BAIT

The coal men's suggestion that congress repeal the federal tax on gasoline in exchange for a 2 cents a gallon tax on fuel oil has the true political horse-trading flavor.

SOME BUILDING

The United States annually consumes enough natural gas to fill a building 100 miles long, 100 miles wide and 9 miles high.

IN REVERSE

Stabilized natural gasoline is partly responsible for unstabilized wholesale and retail gasoline markets. Selling at low prices, it has reduced refinery gasoline sales at many points.

COMPARISON

Taxation figures indicate that while gasoline consumption in 1937 was 8 per cent higher than in 1936, consumption in December, 1937, was about one-half of 1 per cent less than in December, 1936.

UNPOPULAR

Dr. Sachs found his example for a technical board on proration in British administrative practices. Which may be another reason for Americans doubting its application here.

HIGH FLYERS

The "Good Will" flight of the six flying fortresses over the Andes to South America consumed close to 10 tankcars of gasoline and two tankcars of motor oil.

DISTILLATE OUTLET

The average cost of converting house-heating equipment to burning oil has dropped from $600 per unit in 1930 to $300 at present. Over 200,000 oil burners were installed in 1937.

Water Problem Growing Acute in East Texas

By GEORGE WEBER

SHREVEPORT, La., Feb. 28.—With the rapid encroachment of salt water on the west side of the East Texas field, operators are now facing their greatest production problem in the history of the area. Extending over a wider area each week, salt water from the lower Woodbine has shown in increasing numbers of wells. At the present time it represents a problem which must be met with a widespread combative program.

The quarterly water report of the Texas Railroad Commission indicates the extent of the recent encroachment. Daily water withdrawals on January 1 were 85,120 bbls. The total number of wells affected by the rising water table has reached 3,475. During 1937 an increase of 60 per cent is shown in the daily water production and the same per cent gain was made in wells making water.

The rate of wells going to partial water production increased late in 1937, but the rate of increase in total water withdrawal declined slightly. That was due mainly to the drop in production throughout the field occasioned by the Sunday shutdowns, and partly perhaps to a number of successful plug-back jobs which cut water production in several leases.

The rapidly developing condition in East Texas resolves itself into several problems, each vital to the flowing life of the field, and the maximum production of recoverable oil. It is commonly conceded that the production of water has an effect on the bottom-hole pressure of the field identical to that of oil. With oil production under rigid restrictions, the constant gain in volume of water produced from the formation is having a more and more marked effect in the decline of the reservoir pressure.

In addition, the augmented flow in wells making larger percentages of Woodbine water, in order to meet allowable oil production, causes more rapid movement of water and oil through the sand to the wells. Where this rate of movement exceeds the rate at which the oil passes through the less porous sections of the sand, water from the lower sand will drive ahead of the less porous sections, trapping what might become recoverable oil under more curtailed production flow. This coning and channeling of water will cause a tremendous loss in ultimate oil production.

A third and considerable problem at present, mounting in proportion with the rate of water withdrawal, is that of salt water disposal. That this problem is threatening to get out of hand is evidenced by the experiments now under way for returning the salt water to underground sands; an expedient to which operators are resorting in other fields where salt water production is great.

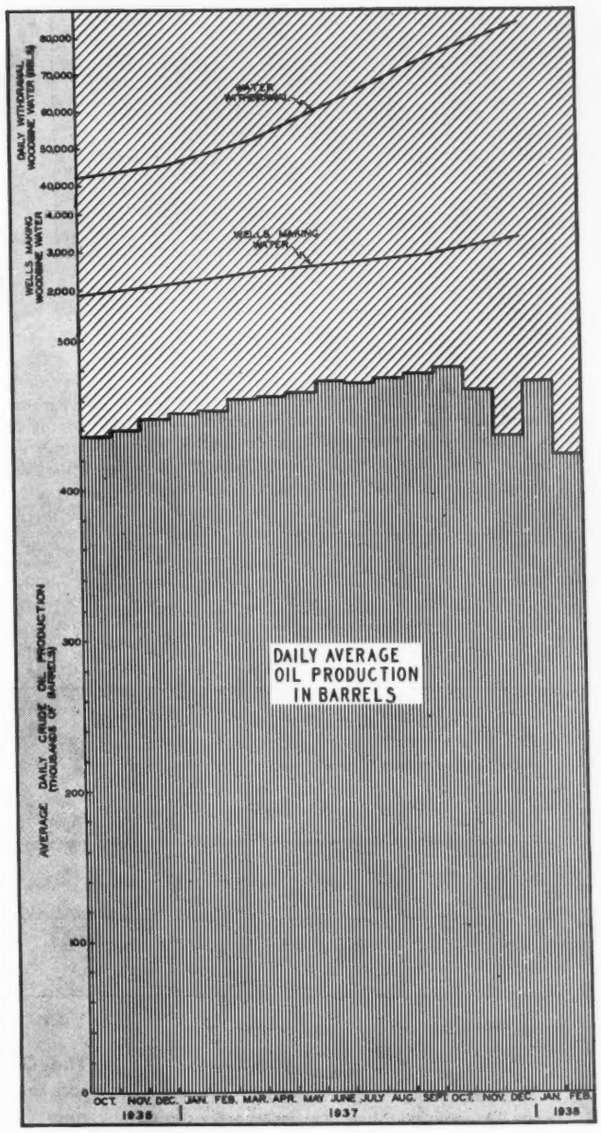
While its effect on the bottom-hole pressure and loss of recoverable oil constitute the two principal problems which water encroachment is bringing to East Texas, the difficulties in curtailing its advance are manifold. Individual well performances and characteristics of the sand on each lease influence the choice of preventive methods. Operators are not agreed on the best possible solution in all cases, however; the one outstanding remedy for the situation lies in the plug-back or squeeze job. At the present rate of encroachment it is estimated that 4,000 plug-back jobs will be necessary this year if the situation is to be corrected.

It is important to note that although the plugging back of wells making water, to a point above the water sand, offers the solution to the large withdrawal rates, this measure cannot be applied to all water-producing wells alike. Its application is limited by the oil sand remaining in the well. Some wells, located in completely flooded areas, are producing water in great quantities in order to gain their allowables. Such wells would not profit from a plug-back or squeeze job so far as the individual production is concerned. They constitute a damaging factor where the bottom-hole pressure decline is concerned, however.

In the case where an oil well making considerable water shows but a few inches or a foot of oil sand, it is problematical whether the cost of a squeeze job or plug-back could be justified by such marginal production. This condition applies strictly to the economics of the individual producer, for it is obvious that a plug-back job on a marginal well, though not warranted from the individual well's standpoint, will, through prevention of excessive water production, benefit all operators generally by tending to sustain the bottom-hole pressure.

THE TRIPLE PROBLEM

(1) The removal of increasing quantities of salt water. (2) Effect of this removal upon bottom-hole pressures. (3) Disposal of this water in large volume.



Trend of water production as related to oil production in East Texas. Data based on Railroad Commission reports

The variable results with plug-backs is illustrated in the summary of that type of work done in East Texas during 1937. Relatively few wells were treated, compared to the number which need such work at present. Of 100 wells plugged back to cut off salt water, 45 were reported to have 100 per cent success. Thirty jobs accomplished partial shut-off of water, and 25 wells were not improved by plugging back. The latter jobs were failures due mainly to mechanical failures and to poor cement jobs. However, several attributed to poor cementing may have been caused by improper handling or subsequent damage to the cement job after going back into the hole. This leads operators to believe that further study of the problem as it concerns all in the water area will raise considerably the percentage of successful jobs.

Return of the salt water to the lower section of the Woodbine sand is a possible alternate solution. This practice, although mainly an expedient in disposal, will also contribute to the leveling of the bottom-hole pressure decline curve, and its widespread adoption may prove valuable.

Whatever the solution of this many sided problem, the need for increased experimentation and study is evident. Work along this line during the next few months will be of great importance in arriving at the best possible combination of meas ures to apply to the varying conditions encountered by the salt water influx.

Farthest east producer at Cement

Cement Field in C

New Operations i

By DAL DALRYMPLE

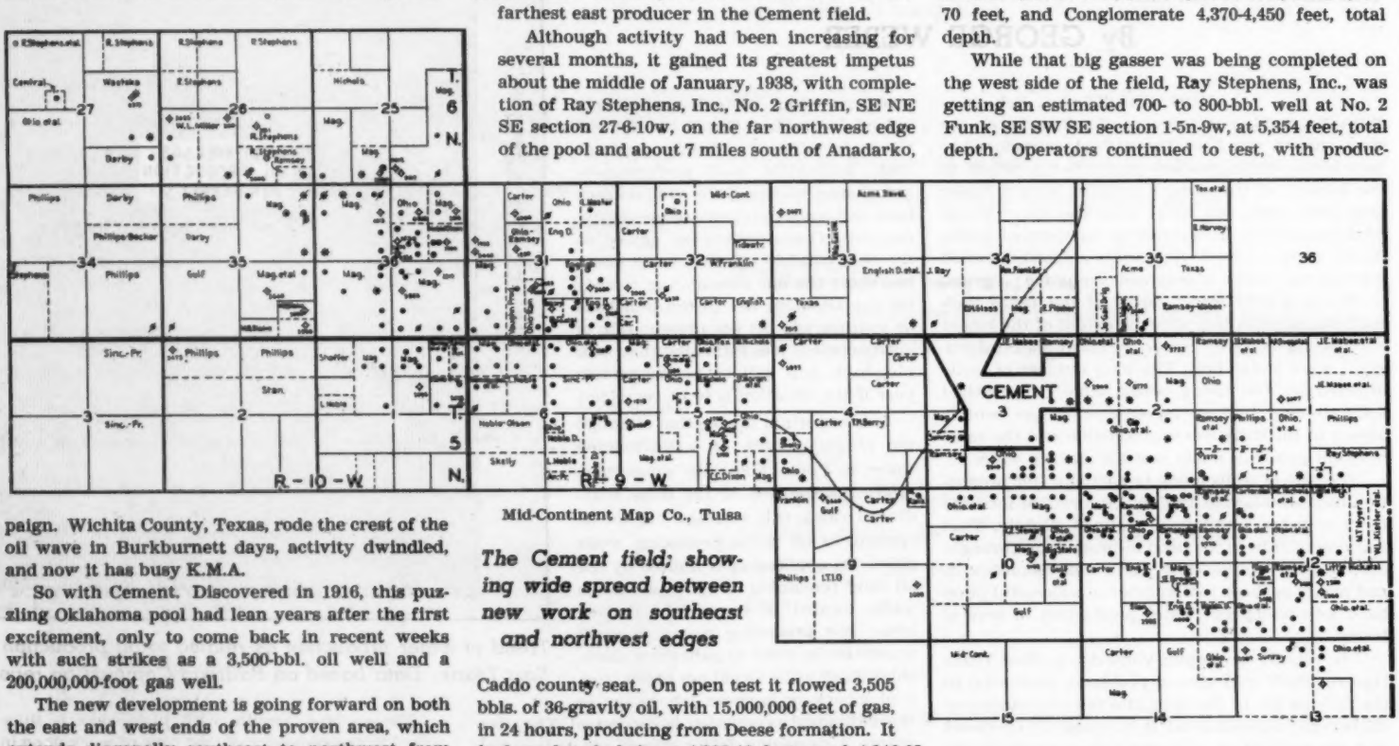
Add to the list of famous comebacks the spectacular Cement oil field of Caddo County, Oklahoma!

The old rule that they never come back may hold true in sports, but it certainly is not applicable to the petroleum industry. Illinois had its heydey many years ago, yet today the Illinois Basin is in the midst of its greatest leasing and drilling campaign. Wichita County, Texas, rode the crest of the oil wave in Burkburnett days, activity dwindled, and now it has busy K.M.A.

So with Cement. Discovered in 1916, this puzzling Oklahoma pool had lean years after the first excitement, only to come back in recent weeks with such strikes as a 3,500-bbl. oil well and a 200,000,000-foot gas well.

The new development is going forward on both the east and west ends of the proven area, which extends diagonally southeast to northwest from sections 1, 12 and 13-5n-9w to section 27-6n-10w, with many intervening locations undrilled. An attempt to extend production across the line into Grady County is to be made by J. B. Nichlos, Chickasha operator, at No. 1 Cleveland, NW NE NE section 18-5n-8w, about 1 mile east of the farthest east producer in the Cement field.

Although activity had been increasing for several months, it gained its greatest impetus about the middle of January, 1938, with completion of Ray Stephens, Inc., No. 2 Griffin, SE NE SE section 27-6-10w, on the far northwest edge of the pool and about 7 miles south of Anadarko, Caddo county seat. On open test it flowed 3,505 bbls. of 36-gravity oil, with 15,000,000 feet of gas, in 24 hours, producing from Deese formation. It had sand and shale at 4,328-46 feet, sand 4,346-62 feet, total depth 4,364 feet. Showings of oil were reported in sandy lime at 3,682 feet, in sand cores at 4,023-28 feet and 4,069-74 feet, as well as at 4,346-62 feet. It was more than one-half mile northwest of nearest production and about 3½ miles north and 7½ miles west of farthest southeast production.



Mid-Continent Map Co., Tulsa

The Cement field; showing wide spread between new work on southeast and northwest edges

Extent of the widely separated activity in the field was indicated that same week in January with completion of a well on the east side. This was Magnolia Petroleum Co. No. 7 Hedlund, SE NW NE section 11-5-9w, in the heart of the old development southeast of the town of Cement. It had Wade sand in Deese formation at 3,812-67 feet, total depth 3,872 feet in shale, and flowed 175 bbls. of oil through 2-inch tubing in 24 hours, with 4,000,000 feet of gas. The far stretch between these two new wells may be visualized readily by a glance at the map.

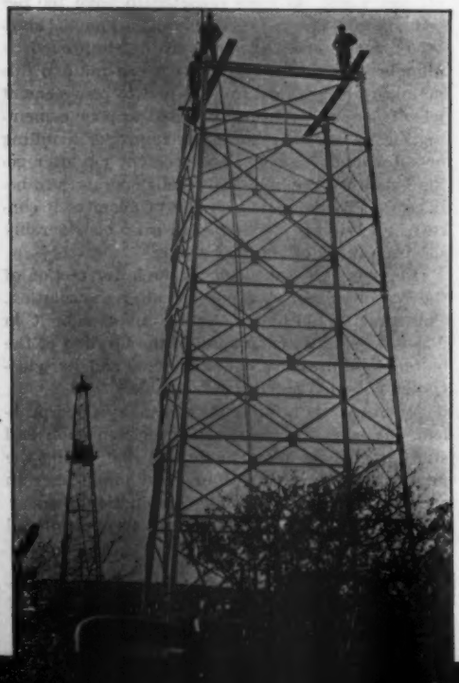
Another indication of the potentiality of the Cement district was provided about the middle of February with completion of one of Oklahoma's largest gas wells, and the biggest in this field. Magnolia Petroleum Co. No. 10 Niles, SW SW NW section 36-6-10w, gauged 203,500,000 feet of gas daily, producing from Deese formation. Rock pressure was 1,650 pounds. It had sand at 4,310-30 feet, shale 4,330-60 feet, sand 4,360-70 feet, and Conglomerate 4,370-4,450 feet, total depth.

While that big gasser was being completed on the west side of the field, Ray Stephens, Inc., was getting an estimated 700- to 800-bbl. well at No. 2 Funk, SE SW SE section 1-5n-9w, at 5,354 feet, total depth. Operators continued to test, with production around 300 bbls. or better through various chokes.

Another recent east-side completion was Ohio Oil Co. and Ramsey Petroleum Co. No. 2 Lemon, Account 2, SW SE SE section 2-5n-9w, which produced 28,900,000 feet of gas from Wade sand at 4,095-4,250 feet. The Ohio company, one of the pioneer operators in the field, has been responsible for much exploration in this district, uncovering several new horizons in numerous wells and drilling one test in 1931 to the 10,179-foot level. It was dry at that depth, but operators plugged back and had small production for several years from shallow pay zones.

Present operations include four tests being drilled by Ray Stephens, Inc. (also operating as Wasteka Oil Co.) in section 27-5n-10w; one by

West Cement field scene



Drilling in the hills of East Cement

n Comeback With s in Two Districts

Steaming up at Ohio Oil No. 2 Lackey

Darby Petroleum Corp. in same section; two now nearing completion, drilled by W. L. Miller and associates in section 26-5n-10w; one by Magnolia Petroleum Co. in section 35-5-10w; five by Ohio Oil Co. and associates in section 11-5n-9w; one by Magnolia in the same section; one by Phillips Petroleum Co. in section 1-5n-9w; one by Olson Oil Co. and associates in section 12-5n-9w, and two by Little Nick Oil Co. (J. B. Nichlos) in the same section. Several other locations are expected to be announced shortly.

A prominent geologist who has followed closely developments at Cement recently declined to elaborate upon the geology of the field declaring that "every well drilled there has to stand on its own geology without depending upon correlations in other wells."

This is borne out in current showings in the two wells drilled by Willard L. Miller in the west extension. His No. 2 Garner, SW NW SW section 26-6n-10w, is the east offset to Ray Stephens' recently completed 3,500-bbl. producer. Yet, when operators attempted to wash in No. 2 Garner during the last week-end the hole filled with salt water at total depth of 4,462 feet. Operators planned to plug back to base of 7-inch casing set at 4,446½ feet and perforate casing in an attempt to produce from upper sands.

Photos, Chickasha Express

The Stephens Brothers: Harold, top; Wayne, center; Ray, bottom, Cement pace-setters

The No. 3 Garner, NW SW SW section 26-6n-10w, offsetting No. 2 on the south, and diagonal southeast offset to the big producer, a completion of the past week, flowed 214 bbls. of 35-gravity oil in the first 15 hours through choke and 248 bbls. in the next 24 hours, with 875,000 feet of gas. It had sand series at 4,380-4,471 feet.

Similar results are not uncommon at Cement, adding to the hazards of drilling in that puzzling district. A year or so ago Ohio Oil Co. uncovered a new deep pay horizon and got good production in an east-side well, but the offset failed to find the new pay and was a disappointment. Such erratic conditions have featured much of the development of the area.

The Cement structure first was mapped by D. W. Ohern and Frank Buttram in 1916, according to Clyde M. Becker, Chickasha geologist and one of the best-informed authorities on southwestern Oklahoma.

The first well was drilled in 1916 by Walter Jones and others at No. 1 Funk, SW SW SW section 6-5n-8w, in Grady County, and about 3 miles east of the town of Cement. It found 500,000 feet of gas at 1,415 feet. This is believed to have been the first showing uncovered in Grady County.

Active drilling on the Caddo County side of the line, where the Cement field was to develop, followed completion in 1917 of the Oklahoma Star Oil Co. No. 1 Kunsemuller, SE NE SW section 32-5n-9w, North Cement Township. At total depth of 1,700 feet it had a sufficient showing of oil and gas to encourage further drilling, according to Frank Reeves, writing in U. S. Geological Survey Bulletin 726-B. This well was started in 1915, with Crockett English, still active at Cement, as one of the operators.

Frank Buttram and associates organized Fortuna Oil Co. and pioneered the field after completion of the Kunsemuller well, selling their interests to Magnolia Petroleum Co. in 1919. The Fortuna company drilled in section 31-5n-9w, completing a 35,000,000-foot gasser at 2,340 feet in sand. In 1918 wells yielding oil from depths of about 2,300 feet, in sufficient quantities to prove a commercial oil field had been found, were completed in both eastern and western parts of the field. In that first Cement boom, development continued fairly rapidly until March, 1920, when 20 oil wells, 4 gas wells, and 2 failures had been completed and 36 wells were being drilled.

The price of oil declined in 1921 and most of the Cement activity was discontinued. When the petroleum industry generally was prospering in the 1925-27 period, the upswing was not reflected at Cement because there were no pipe-line connections and the purchasing company in the area did not pay the posted price. However, Anderson-Prichard Oil Corp. took over the refinery at nearby Cyril in 1929 and started paying posted prices. Today the bulk of the oil produced at Cement is taken by the Cyril refinery.

Early Shallow Development

The early development was confined to Caddo and Fortuna sands, in Permian red beds, at 1,600-1,800 feet and 2,100-2,500 feet. Although those formations are seldom oil-bearing, they produced upward of 6,000,000 bbls. of oil at Cement by 1930, according to Mr. Becker.

Deeper production was uncovered in 1929 when Noble-Olson Drilling Co. completed a 300-bbl. well in basal Permian at 3,160 feet, in section 26. In 1930, Mid-Kansas Oil Co. (now Ohio) uncovered a sand approximately at 4,050 feet, the discovery well in this horizon having initial yield of 135 bbls. daily.

Deep sands which have been found productive of gas were uncovered at Magnolia No. 5 Hedlund, NE section 11-5-9w, at 4,523-4,545 feet; Ohio Oil Co. No. 6 Lackey, in section 11-5-9w, at 4,855-4,978 feet; and Ohio No. 1 Yule, in section 1-5-9w, at 4,900-4,925 feet—production ranging from 45,000,000 to 50,000,000 feet in each well.

Discovery of a new producing horizon was recorded at Ohio Oil Co. No. 4 Marchand, in section 2-5-9w, in 1936, yielding both oil and gas at around 6,300 feet. This was the forerunner of much of the current drilling activity.

Recent Operations

The Ray Stephens, Inc., and Wasteka companies, jointly owned, are responsible for much of the later development. A few years ago the Stephens interests drilled a deep gas well on the east side. There was no market, so another test was drilled and it, too, was a gasser. Some shallow wells followed. In order to protect leases, Ohio, Ramsey, and Magnolia companies followed suit and the new play was under way. W. R. Ramsey recently sold most of his personal holdings in the district to W. L. Kistler, Inc., and Phillips Petroleum Co., both now operating in the field.

W. L. Miller started the new play on the west side on leases he took on a deal with Carter Oil Co. in 1933. His first well on the Garner tract in SE SE SW section 26-6n-10w, was a gasser. The Stephens company then turned attention to the west side and completed a big gasser on the Melton tract in S half SE

Rig builders at work on W. L. Miller well

Kenneth Nelson, driller, watching gauges at Stephens No. 2 Griffin

section 26-6n-10w, forcing Magnolia to enter the west side play on its leases in sections 35 and 36-6n-10w. The Stephens 3,500-bbl. oil well followed and Cement was back in the oil news in a big way.

Long Development Program

Development will likely be slow, because of tricky structural conditions, but it undoubtedly will continue over a long period of years. The numerous pay horizons make this certain. With pay zones at around 1,500 feet, 2,000 feet, and at intervals of every 100 feet or so, much work remains to be done as operators test these various horizons either by plugging back or deepening existent wells. A general redrilling of the proven area in the elongated field may be expected when the oil is needed. Many inside leases remain to be drilled, some areas within proven territory having been barely tapped. Thus, if operations were confined entirely to the district now considered as proven, the development program would continue over a period of several years.

But the field has not been defined. It has not been limited to the northwest, nor has it been entirely cut off to the south and east. Outlying producers in either of those sectors would open up much more territory—and in view of the history of Cement, who is there to say production will not be pushed far beyond present limits? It is a risky business to predict outcome of Cement tests. Production may be carried far over into Grady County, far to the west or northward toward Anadarko; and it may stop right where it is. Each well provides its own geology; only future drilling can determine extent of the field. But before that is done there will be much activity, and the town of Cement and neighboring cities of Chickasha and Anadarko will prosper.

Fuel Oil Tax in Place of Federal Gasoline Tax?

By HENRY D. RALPH

WASHINGTON, D. C., Feb. 28.—Repeal of the federal tax on gasoline in exchange for a new tax of 2 cents per gallon on fuel oil is the plan of strategy adopted by coal interests supporting the proposal of Representative Patrick J. Boland of Pennsylvania to have a fuel oil tax included in the pending revenue revision bill.

This plan was revealed by Congressman Boland when he originally appeared before the house committee on ways and means to urge that a tax of 1 cent per gallon be included in the revenue bill. In addition to his oral testimony, he submitted a memorandum in support of the proposal. Included in this memorandum was a section drafted by unidentified interests which obviously was not intended for the public.

This memorandum is very enlightening. It suggests that the effect of the proposed tax on the coal industry be played down and instead the greatest publicity be given to the angle that fuel oil is a luxury, that the tax will aid in conservation of petroleum, and that it will produce much needed federal revenue. In discussing the competition between coal and fuel oil, the memorandum says:

"In considering the matter of equalization, we do this with the thought in mind that publicly it must be given the minimum of prominence despite its legitimate importance under present conditions. A serious public effort toward equalization between oil and coal might lead to opposition in a manner that would jeopardize the entire bill. . . . A thought occurs for an amendment of the bill that, it is believed, will increase the importance of this measure and the desirability of its passage from both the revenue angle and the conservation of oil that would result. . . . With these thoughts in mind it is suggested that the bill be changed in two major particulars. First, increase the proposed tax on the sale of fuel oil and gas oil to 2 cents per gallon, and in return repeal the existing federal tax on the sale of gasoline."

The memorandum estimates that at 2 cents per gallon the fuel oil tax would raise $298,667,880 annually, as compared with the $172,262,480 produced by the federal gasoline tax of 1 cent per gallon, so the government would gain an increase in net revenue of $126,405,400 by this exchange of taxes.

"To make this change in the proposed bill will have a certain favorable bearing on opposition that will naturally arise," the memorandum continues. "In the case of domestic consumers, it is doubtful whether few would have any real opposition. In the first place, the domestic consumer is not vocal nor organized. Next, you would be removing a burden from the operation of the consumer's automobile, which equipment he operates 12 months of the year. On the other hand, while you are placing a burden on his heating plant, if it is oil, he only operates his oil burner seven months of the year. Again, more people drive automobiles than burn oil. In addition, you would be leading him into a means of cheaper and more efficient heat. . . .

"Again, from the standpoint of the nation as a whole, the conservation of oil as a military defense measure is absolutely necessary, and for the sake of the whole of our country, the tendency to go back to coal, that would be thus created, would be to the best interests of the consumer as well as the taxpayer.

"The proposed 2 cents tax on fuel oil is an absolute luxury tax and could be readily classed alongside the amusement tax passed by the congress some years ago. As a tax it does not fall on a necessity of life, and therefore the individual really has the decision as to whether he comes under the tax imposed by the bill. Again, the tendency that would be created by this tax would undoubtedly be of assistance to the oil man toward the necessary conservation of our oil resources, and lastly, it would insure a net gain in badly needed revenue on the part of the federal government, and at the same time be in line with the opinion of numerous state executives to the effect that the federal government should leave the taxation of gasoline to the state governments as a source of revenue.

"In view of the strenuous positive opposition to the foregoing proposal, we take the liberty of suggesting the following basic procedure and offer it at this time for thought, criticism, and further suggestions . . . if and when the bill reaches the floor of the house, have some friendly congressman amend the bill to a 2-cent tax per gallon and propose an amendment for the removal of the federal gasoline tax, to which suggestions the author of the bill would readily agree. If such action were possible, it would prevent a great deal of the opposition from materializing and avoid much of the fight that can be readily anticipated."

A few copies of the

1938 Production-Equipment Survey

(insert of February 24)

are still available. This remarkable survey—first of its kind ever made in the oil industry—covers the following seven points of information for every important oil area in the United States:

(1) Number of wells. (2) Daily production. (3) Number of wells artificially producing. (4) Number of wells to be equipped in 1938. (5) Probable type of equipment to be purchased. (6) Probable type of prime movers. (7) Special conditions affecting each oil territory.

This survey, well printed and folded down to convenient size, sells at 10 cents a copy in quantity of less than 100. Order and payment for the desired number of copies should be addressed to

SURVEY DEPARTMENT

The Oil and Gas Journal Tulsa, Oklahoma

Construction inside Richfield's new refinery at Watson, Calif. The six heaters, largest on Pacific Coast, will be used in cracking service

Refinery Construction Is Being Maintained at Rapid Pace

By T. P. SANDERS

LOS ANGELES, Feb. 28.—Encouraging scenes of industrial activity may be viewed by a recession-worried business man at the Richfield Oil Corp.'s Watson refinery in the Los Angeles Basin. Here the refinery construction boom, which has been in progress for nearly a year on the Pacific Coast, is most conspicuous. Crews are at work on six vertical cracking heaters and two horizontal topping heaters. The superstructures of the cracking heaters rise 132 feet above the ground. Since record breaking is almost an industry in itself in California, the fact is worthy of note that these are the largest heating furnaces ever constructed on the Pacific Coast. While the East has installations of the same size, there are no larger heaters in existence.

As the Watson construction program progresses, other records will probably be broken. At present, arrangements are being made for one-way traffic over the railroad tracks to the site to permit moving in the fractionating towers and other bulky items. Due to increasing size of equipment, it is quite usual in modern refinery construction to encounter difficult transportation problems before the equipment is all made available at the plant.

The Richfield concern was reorganized last spring to end a receivership of seven years' duration, and the new company is energetically pursuing a program of expansion in all departments. The largest single item on the program is the enlargement of the Watson plant. At an expense of about $5,000,000 two combination crude-topping and cracking units are being added, and plans call for a gasoline-treating and finishing plant and a polymerization plant. Each of the new combination units will have a capacity of 30,000 bbls. of crude per day. Formerly the Watson plant had a crude-oil capacity of 40,000 bbls. per day with a cracking capacity of 16,000 bbls. per day. The new units, for which the furnaces are now under construction, will be completed early next fall.

New Units

The six vertical heaters being erected are De Florez products. Three of these will be used with each combination unit and will be supplemented by two Alcorn horizontal heaters, one for each unit. Crude oil entering either one of the new combination units will pass into the Alcorn furnace after it has been pumped through a system of heat exchangers, where its temperature will be raised by hot streams from the fractionating towers. This furnace will be double-fired, one side being used for heating crude, while the other is used for heating reduced crude from the flash tower. Each side will consist of a radiant heating section surrounded by carbon-steel tubes. Gases from both sides will discharge into a common down-draft convection section. The crude entering the furnace will pass upward through a bank of the convection tubes and into the radiant tubes. The heat transmitted to the crude in the furnace will vary from 3,500,000 to 20,000,000 B.t.u. per hour, depending on the efficiency of the heat exchangers. When the exchangers become dirty, the furnace-fuel consumption will correspondingly increase to maintain a uniform outlet temperature of 625 degrees. At this temperature the crude will pass to the flash towers where the straightrun gasoline will be removed.

Reduced crude from the flash towers will return to the Alcorn furnace and will enter the constant-load side through a bank of convection tubes. In this side of the furnace 25,000,000 B.t.u. per hour will be transmitted to the charge and the outlet temperature of the reduced crude will be 670 degrees when it passes on to the De Florez heaters.

A uniform temperature of about 1,000 degrees will be maintained in the De Florez heaters to induce cracking. Since each heater contains about 1½ miles of 5-inch tubing, considerable time will be required for the reduced crude to pass through each heater, thus insuring sufficient time of cracking. The use of three of these large vertical heaters

in each cracking unit will permit practically any recycling ratio which may be desired.

Heaters alone for the new units will cost about $1,000,000 and will transmit to the oil approximately 600,000,000 B.t.u. per hour. Tubing used in the De Florez heaters will be entirely of chrome-molybdenum alloy steel. These vertical heaters are 30 feet in diameter, 65 feet high, and the hoisting frames which will be used for installing and replacing tubes in the heaters are 132 feet high. Firing will be by downdraft using several gas burners in the top of each heater. The alloy-steel tubes located around the periphery of each interior will receive heat from a refractory cone in the center of the chamber.

The Alcorn furnaces will use 40-foot tubes. There will be 15 firing tunnels on each of the two firing sides of each furnace, and these will be fitted with combination oil, gas, and sludge burners suitable for single or simultaneous firing. It is probable that about 50 per cent sludge will be used in these furnaces with an equal portion of gas. Each furnace will have a self-supporting steel stack 5 feet in diameter and 100 feet high.

Seven separating and fractionating towers are to be used for each of the new combination units. These are under construction at Alhambra. The largest are 13 feet in diameter and 60 feet high, and are lined with chrome-molybdenum alloy. Weighing between 100 and 125 tons, it is readily seen that transporting these to the refinery site will represent a difficult problem.

About 50 pumps will be installed. Most of these will have electric-motor drives. Working parts of pumps, as well as much of the piping about the new units, will be made of alloy steel.

New construction at the Richfield refinery will include a complete polymerization plant in addition to the combination units and the gasoline treating and finishing plant. With an input capacity of 6,000,000 feet of gas per day, the polymerization plant will take gas from the stabilizer reflux accumulator of the cracking plant to manufacture high-octane gasoline. The catalytic polymerization process will be used. This process was developed by Universal Oil Products Co., and has been licensed from that concern.

Gas-Treating Unit

Since gas from the cracking units will contain hydrogen sulfide, a gas-treating plant will be installed to prevent corrosion in the catalyst chambers. This treating plant, licensed from Shell Development Co., will make use of tri-potassium phosphate solution for removal of hydrogen sulfide. The gas will rise in a 40-tray bubble tower where it will pass through a down-stream of tri-potassium phosphate solution. Regeneration of the solution will take place between each cycle. It is expected this treatment will reduce the hydrogen sulfide content from between 1,000 and 2,000 grains per 100 feet of gas to approximately 30 grains per 100 feet.

Gas will pass from the hydrogen sulfide removal plant through a heater to the polymerization plant at a temperature and pressure sufficient to start reaction in the catalyst beds. After reaction starts, there will be a marked temperature increase due to heat of reaction. The magnitude of this temperature pick-up will vary with the olefin content of the gas. Therefore, the transfer temperature to which the gas will be heated before it enters the chambers will be a function of its analysis. Solid phosphoric acid will be used for the catalytic agent. Three catalyst chambers will be employed in series through which the flow of gas will be downward. The plant will consist of five chambers so that one will always be available as a standby while three are in operation and the fourth is being regenerated.

After leaving the catalyst towers, the products of reaction will be condensed and passed to a receiver where the lean gas will be separated from the polymer proper. The lean gas may be recycled by injecting it into the main process-gas stream. The polymer product will be stabilized to a suitable vapor pressure.

The catalyst towers will require regeneration after 500 to 1,000 hours of operation. To accomplish this the carbonaceous material coating the catalyst will be removed by burning with a controlled volume of oxygen in flue gas at a temperature between 600 and 950 degrees.

At the present time it is not known what the output of the polymerization plant will be. This will be determined to a large extent by the manner in which the fractionators of the cracking plant are refluxed. It is believed the polymer product will be used for blending to increase the octane rating of the straightrun and cracked gasolines.

In addition to the installation of the new equipment, other expenditures are planned at the Watson site to modernize the older plant and synchronize the old and new equipment. Within the past week a new contract has been let to Bechtel-McCone Corp. to cover construction of a single-flash re-run unit in the old plant. This will have a daily capacity of 8,000 bbls. per day, and will add another $100,000 to the investment in this rapidly growing refinery.

Compact Technical Board Proposal Is Criticized

NEW YORK, Feb. 28.—Varied reactions were found last week to the suggestion by Dr. Alexander Sachs before the A.I.M.E. petroleum division, that activities of the Interstate Oil Compact Commission in particular and the state regulatory bodies in general might be assisted by a technical board.

The technical board suggested by Doctor Sachs would be composed of engineers of recognized

Blank & Stoller

DR. ALEXANDER SACHS

ability selected by the Interstate Oil Compact Commission from a list of nominations proposed by the industry. Members of the board would serve on a rotating basis, insuring a continuity of policy free of political influences.

In an attempt to appraise the reaction in the industry, to the suggestion, opinion was found general that such a board, properly constituted and adequately supplied with authority to impose its findings would serve a healthy purpose, but there was found an equal lack of uniformity of opinion as to whether the plan is practical and whether it could be successfully applied. Most persons were inclined to give considerable credit to the Interstate Oil Compact Commission and to the state regulatory bodies. There was criticism, however, as to whether they are fulfilling their functions adequately. The hint of Secretary Ickes that something was left to be desired in the administration of oil affairs was picked up by some as an argument in favor of a technical board to supplement the Interstate Compact Commission. sion.

Practically all agree that proration, used liberally, must work. There is no alternative but to keep petroleum production and consumption in reasonable balance, if undesirable regulation is to be avoided.

Many think the Interstate Compact Commission would not welcome a technical board over which it could exercise only limited powers. Others think it would be a mistake to relieve the state bodies and the Interstate Compact Commission of responsibility in administration of proration and they point out the delicacy of the jealousies between states. Others, recognizing the jealousies between states and their desire to maintain authority over their individual problems, see in the creation of a technical board a solution to many current evils and the most logical means of insuring against federal interference.

One view was that a technical board might be quicker to adjust apparent discrepancies in the calculated and actual requirements of production.

Most of the current ills of the oil business are laid to the tendency to overestimate requirements during the last half of 1937. The overestimates followed an almost equal period of underestimates during which various states fell into the habit of determining their own requirements. When adjustments were made during the last six or seven months of 1937 more in keeping with consumer demand, the states continued exceeding recommendations with the result that surplus continued to rise when retrenchment was normally advisable. The leveling off process would have produced satisfactory results, but for the lack of flexibility in the administration of production regulations. With closer cooperation between the technical determination of consumer demand and the various mechanics of the industry at large, including production and refining branches, it is held future disparities might be avoided.

On the other hand, the contention is made that the Interstate Compact Commission has access to the best technical advice available in the industry itself had it elected to call it into service.

Simpson Discovery in Callahan County

By MITCHELL TUCKER

FORT WORTH, Tex., Feb. 28.—The entire West Central Texas territory is opened to Ordovician exploration following the discovery of a prolific Simpson sand producer last week in southwestern Callahan County.

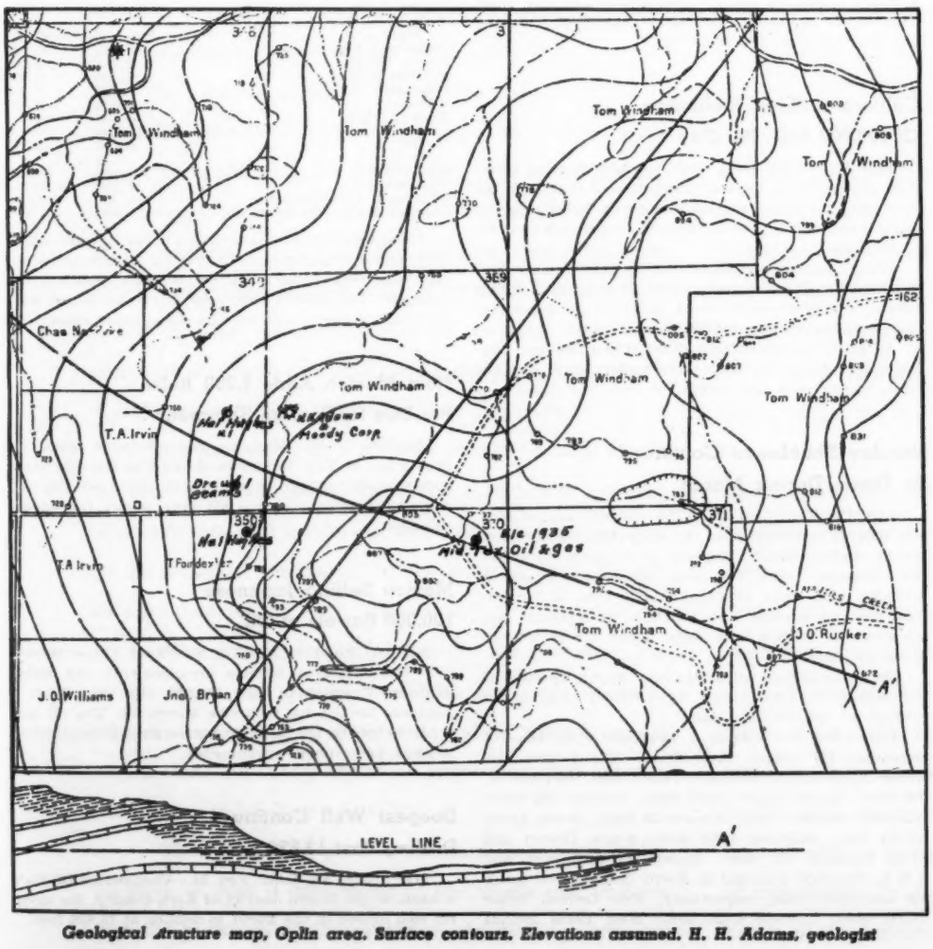
In the Oplin area, about 10 miles southeast of Abilene, Tex., Hal Hughes and associates are completing their No. 1 Poindexter in the northeast corner of the George Hancock Survey. After drilling saturated Simpson lime (Middle Ordovician) from 4,369-89 feet, and acidizing with 3,000 gallons, the well blew in flowing a steady stream of oil through 2-inch tubing, and was allowed to produce so for two hours into pits. After an 18-hour shutdown period, it was reopened and showed no decrease in flowing rate. In 30 minutes the tubing pressure built up to 875 pounds. Estimates of the well's natural potential ranged from 1,000 bbls. per day upward, with an accompanying gas volume of about 5,000,000 feet daily.

Tanks are now being erected to test the well which promises to revive the old West Central or Ranger district of Texas. The accompanying geological column shows the relative position of the new producing horizon compared to the Marble Falls and Ranger limes from which most of the old production comes. Not only the present producing structures, but all intermediate acreage is now being considered for Ordovician prospecting following this important discovery.

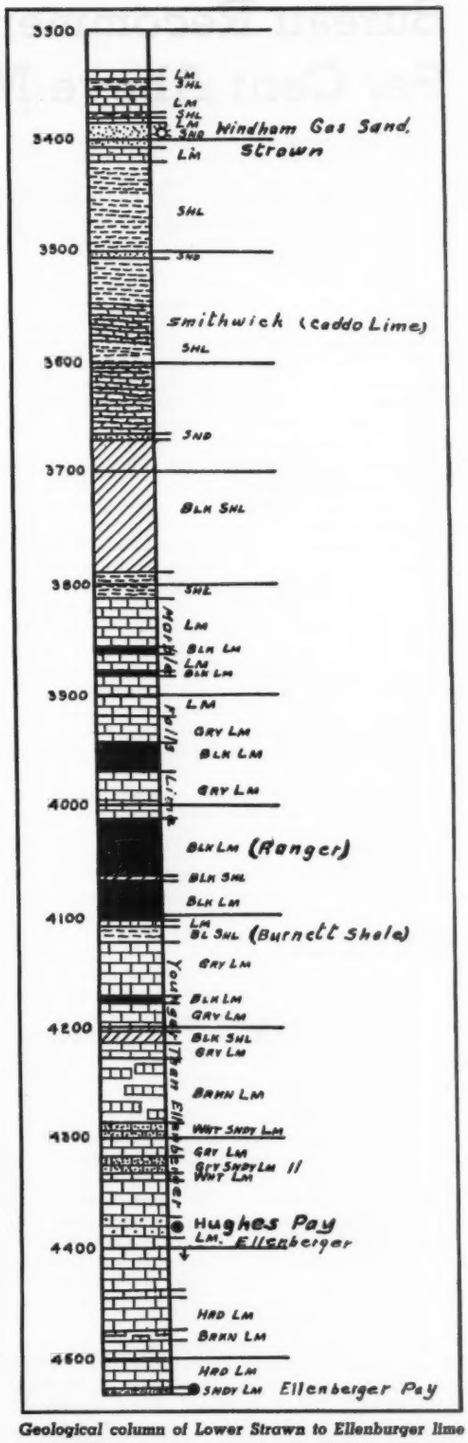
The development of the Oplin prospect was not without its difficulties and setbacks. In fact, a 13-year search has been necessary, during which time the original believers in the area did not lose faith.

H. H. Adams, geologist of Abilene, Tex., did the geological work there it late 1924. A year later he started his No. 1 Windham, section 369, and completed it as a 2,000,000-foot gas well in a 20-foot sand near the base of the Strawn series, total depth 3,369 feet. This well is still producing, and furnished drilling fuel for all subsequent drilling on the structure.

In 1934, Drew Beans and others, with the assistance of Mr. Adams, assembled a block on the structure and drilled a cable tool test to 4,489



Geological structure map, Oplin area. Surface contours. Elevations assumed. H. H. Adams, geologist



Geological column of Lower Strawn to Ellenburger lime on Windham structure, southwest Callahan County, Texas. Elevations based on Hughes No. 1 Poindexter. H. H. Adams, geologist.

feet in the Ellenburger lime, from which several large heads of oil were produced. Mechanical difficulties necessitated the junking of this hole before complete production tests were made.

Hal Hughes, driller and contractor in many of the oil booms during the past 20 years, was standing on the derrick floor while the Beans well made some of its flows, and became convinced of the Oplin structure possibilities. He contracted to drill two tests there.

The first test was drilled 1,200 feet north of Beans No. 1, and was taken to the Ellenburger, but due to nonporous conditions at this point.

(Continued on Page 34)

Bureau Recommendation Five Per Cent Above March, 1937

The daily average supply of domestic crude oil estimated by the Bureau of Mines to meet the demand in March, 1938, is 3,391,600 bbls. This is 46,600 bbls. less than the estimate for February, 1938, 51,100 bbls. (1.5 per cent) less than the actual daily production for March, 1937, but 5 per cent higher than the demand for domestic crude for that month.

Crude oil production during the four weeks, January 1 to 29, averaged about 3,447,000 bbls. daily. During this period, crude-oil stocks increased 818,000 bbls., of which 225,000 bbls. was in foreign stocks, leaving 593,000 bbls. as the increase in domestic crudes, which would make the demand for the latter 3,426,000 bbls. daily. This compares with the bureau's estimate of 3,407,000 bbls., the difference of 19,000 bbls. accounting in part for "excess" accumulation in gasoline stocks.

Outlook for next six months.—As finished and unfinished gasoline stocks on March 31, 1937 (81,651,000 bbls.) were generally considered too high at that time, contemplated stocks of March 31, 1938 (93,000,000 bbls.) may be considered too high by at least about 11,000,000 or 12,000,000 bbls. Nearly all of this was accumulated after the low point of September 30, 1937; in other words, the surplus would be largely worked off if stocks on September 30, 1938, were no higher than on September 30, 1937, when they were 65,380,000 bbls. Using this as the gasoline-stock objective, contemplating an increase of 3 to 4 per cent in gasoline demand and adjusting the monthly withdrawals from gasoline stocks so as to keep operations close to a uniform level, gives a crude-oil demand for the next six months of just over 3,400,000 bbls. daily, including crude runs of about 3,200,000 bbls. daily with gains indicated in the fall when the need for storing heating oils will become more acute.

Domestic demand.—The estimate for domestic motor-fuel demand for March, 1938, is 40,680,000 bbls., or only one-quarter of a per cent higher than the apparent demand for March, 1937, but about 5 per cent above the estimated normal demand for that month.

Exports.—Motor-fuel exports have been estimated at 3,600,000 bbls. This apparently high estimate (actual exports of a year ago were only 2,426,000 bbls.) was based on returns from the principal exporters.

Stocks.—Stocks of finished and unfinished gasoline amounted to 76,990,000 bbls. on December 31, 1937. According to statistics of the American Petroleum Institute, these stocks increased about 8,000,000 bbls. during January, bringing them to approximately 85,000,000 bbls. as of January 31, 1938. Assuming the increase in February is held to 6,200,000 bbls., the bureau's February figure, stocks on February 28 will be just over 91,000,000 bbls. In view of the seasonal decline in heating-oil demand and the surplus gasoline stocks, the increase for March was estimated as only 1,900,000 bbls., or somewhat less than normal. This increase, if realized, would bring stocks to a peak of about 93,000,000 bbls. at the end of March, compared with actual stocks of 81,651,000 bbls. for a year ago.

Gasoline production.—Benzol and "direct" sales and losses of natural gasoline have been estimated as 950,000 bbls., making the estimated production of gasoline 45,230,000 bbls. This is distributed among the various districts as follows (thousands of barrels): East Coast, 6,480; Appalachian, 1,510; Indiana-Illinois, 7,720; Oklahoma, 2,880; Kansas-Missouri, 2,470; Texas Inland, 3,590; Texas Gulf, 10,290; Louisiana Gulf, 1,380; North Louisiana-Arkansas, 920; Rocky Mountain, 1,110; California, 6,880.

Runs to stills.—Natural gasoline consumption at refineries in March is estimated at 6 per cent of the total gasoline required, or 2,710,000 bbls. The yield of straight-run and cracked gasoline is estimated as 43.3 per cent, compared with 43 in February. The application of this yield to the estimated straightrun and cracked gasoline production of 42,520,000 bbls. gives refinery crude-oil requirements as 98,140,000 bbls.

Foreign crude runs.—Foreign crude run to stills is estimated as 2,200,000 bbls.

Exports, fuels, and losses.—Crude-oil exports have been estimated at 6,500,000 bbls. The estimate for crude oil burned as fuel and losses is 2,700,000 bbls.

Crude oil required.—The application of the usual methods to the total estimated market demand for domestic crude oil gives the following breakdown by states or origin:

TABLE 1—ESTIMATED CRUDE OIL REQUIREMENTS BY STATES*

(Daily averages in barrels)

State—	Forecast Mar. 1938	Forecast production Feb. 1938	Actual Dec. 1937
Texas	1,344,900	1,365,700	1,336,500
California	694,600	693,700	705,000
Oklahoma	547,700	569,700	569,500
Louisiana	239,400	239,400	241,800
Kansas	176,700	176,400	178,400
New Mexico	105,100	105,100	108,700
Michigan	51,600	52,800	51,400
Pennsylvania	49,700	50,400	52,900
Wyoming	46,400	51,800	48,700
Arkansas	38,200	36,800	42,200
Illinois	30,700	29,900	35,000
Kentucky	13,900	14,500	14,100
New York	13,800	14,000	15,000
Montana	13,300	12,400	12,400
West Virginia	9,700	10,000	10,600
Ohio	9,100	9,000	9,200
Colorado	4,500	4,400	4,300
Indiana	2,300	2,200	2,300
Total	3,391,600	3,438,200	3,438,000

*The estimates in this table have been calculated as the market demand requirements for the months stated and are not intended to be calculations of daily average demand for the current year or for any period other than the months stated. As no changes in crude-oil stocks are involved in these estimates, they represent demand rather than production.

Louisiana's March Allowable Is Given Small Increase

NEW ORLEANS, La., Feb. 28.—The Conservation Commission of Louisiana fixed crude oil production allowables in March in North Louisiana at 72,000 bbls. per day and in south or coastal Louisiana at 174,755 bbls. per day, a total of 246,755 bbls. per day for the state. This figure represents an increase of 2,055 bbls. per day over the February allowable.

California Plans Reduction Of 100,000 Bbls. Per Day

LOS ANGELES, Calif., Mar. 1.—At a meeting of all field chairmen the Central Committee of California Oil Producers approved a program that contemplates immediate reduction of 100,000 bbls. in California's daily oil production.

During January crude oil buyers stored more than 100,000 bbls. of crude and refined oil daily, and during February a preliminary check indicates an accumulation of approximately 200,000 bbls. per day.

All major operators have either already reduced production or expect to have their respective production down to the allowable within the next few days.

Sunday Shutdowns Continued In Texas During March

AUSTIN, Tex., Feb. 28.—The railroad commission has ordered continuance of the statewide Sunday shutdowns during March. Rodessa is excepted to offset the Louisiana wells. The state allowable was set at 1,300,506 bbls. daily of which 55,970 bbls. is for foreign demand, leaving 1,244,536 bbls. as domestic outlet which is 109,364 bbls. daily under the Bureau of Mines estimate.

The commission calculates the March shutdowns will reduce the total output by 5,972,692 bbls., or an average of 192,667 bbls. daily.

Allowables as of March 1 compared with those of December 18, follow: East Texas 497,642 bbls., increase 8,126 bbls.; Panhandle 74,578 bbls., increase 6,000 bbls.; Moore County 1,475 bbls., increase 150 bbls.; Osborne area 560 bbls., increase 20 bbls.; North Texas 59,995 bbls., decrease 4,258 bbls.; Foard County 702 bbls., increase 47 bbls.; Anderson-Kerr, Gant and K.M.A., formerly included in North Texas, given 3,016, 209 and 7,431 bbls., respectively; West Central Texas 73,341 bbls., increase 6,025 bbls.; West Texas 186,531 bbls., increase 19,421 bbls.; East Central Texas 109,018 bbls., increase 22,549 bbls.; Southwest Texas 266,056 bbls., increase 36,056 bbls., and Gulf Coast 216,056 bbls., increase 31,797 bbls.

Talco and Sulphur Bluff were equalized with an allowable of 50 bbls. daily to each well, reducing Sulphur from 65 to 50 bbls. and raising Talco from 46 to 50 bbls., which resulted in a net gain of 1,326 bbls. daily for the two pools.

East Texas is continued at the ratio of 2.32 per cent an hour's potential which brings it to nearly 500,000 bbls. daily. Conroe was increased 6,000 bbls. daily to 40,065 bbls.

Ernest O. Thompson justified special increases where new markets are found, declaring foreign demand had increased 57 per cent over 1936. He says these increases have no effect on the domestic markets and constitute no discrimination as all such requests are granted where definite proof is presented of a newly-found market for Texas crude.

The next statewide oil proration hearing will be held March 19. The Saturday date was scheduled so operators might attend the geological meeting in New Orleans, March 16.

March Allowable in Oklahoma Is Reduced to 475,000 Bbls.

Oklahoma allowable production for March was set at 475,000 bbls. of oil daily by the corporation commission, a reduction of 25,000 bbls. daily under the February allowable. The Bureau of Mines estimated demand for Oklahoma crude in March was 547,700 bbls. daily.

Allowable production for prorated areas was set at 323,496 bbls. daily in the commission order, while the figure for the stripper and unprorated areas was set tentatively at 151,000 bbls. daily. A special hearing will be held February 7 to determine allocation for the stripper fields of southern Oklahoma. A protest has been lodged with the commission against a proposed reduction of 6,000 bbls. daily in the stripper fields of Carter and Stephens counties.

W. J. Armstrong, state conservation officer, recommended changes in allowables for the following major fields, as shown:

Field—	February	March
Oklahoma City-Wilcox	87,386	85,699
North Bethel	2,250	2,000
Billings-Wilcox	6,339	6,000
Crescent	6,300	5,500
Edmond	7,650	6,650
Keokuk Falls	5,850	4,850
Lucien	11,250	10,750
Moore	6,750	5,500
Stillwater	135	...
Fitts-Hunton	21,600	20,600
Fitts-Simpson	31,050	30,361
Oklahoma City-Simpson	16,200	15,450
Oklahoma City-Tonkawa	1,350	750

He also recommended revisions in the stripper allowables and a 10 per cent reduction for all new areas not now classified. Other pools of the state remained unchanged. The official order was due to be issued later this week, subject to revision on the stripper areas.

New Mexico Adds 4,000 Bbls. Per Day for Foreign Shipment

HOBBS, N. M., Mar. 1.—The allowable crude oil production in New Mexico in March was fixed by state conservation authorities at 101,100 bbls. per day for domestic shipment plus 4,000 bbls. a day for export shipment.

Mexico Selling Japanese 100,000 Barrels of Oil

NEW YORK, Feb. 28.—The New York Times' Mexico City correspondent reports arrangements are being made at Tampico to load 100,000 bbls. of oil on a Japanese tanker due to arrive March 20. The oil was reported sold by the National Petroleum Administration, Mexican government organization.

Deepest Well Continues Drilling Past 13,820 Feet

LOS ANGELES, Calif., Feb. 28.—Continental Oil Co.'s wildcat in the Wasco district of Kern County, the deepest well drilled in the world, is drilling at 13,820 feet.

The OIL AND GAS JOURNAL

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Improving Proration

How to improve proration was discussed at two widely separated meetings last week, recognition that there is urgent need for improvement.

President Axtell J. Byles of the American Petroleum Institute, addressing the North Texas Oil and Gas Association at Wichita Falls, warned that proration, and with it conservation, are threatened by certain practices.

Before the economics section of the petroleum division of the A.I.M.E. in New York, Dr. Alexander Sachs said a great many of the developments in the functioning of proration, including its frictions and recurrent maladjustments, are due to not having added to proration the necessary arms or organs of administration.

He referred to the dilemmas the industry has encountered from time to time—"dilemmas that arise if you allow the crude price to reflect and get into alignment with the gasoline price, then you have one kind of political pressure; if you have the gasoline price reflect the excess carry-over, another kind of political pressure; but I believe those pressures would be removed and those problems would be solved if the industry adopted organs of deliberation about its own economic problems."

His proposal was that there should be attached to the Interstate Compact Commission a technical division of economists and engineers, selected from nominations by the technical bodies and by the industry itself through its organizations, to work continuously on the problems.

With such a board he thought the pressures between states and groups would be lessened by being filtered through these technical bodies whose reports would show the continuity of the experiment and indicate the lessons to be drawn from it.

The function of such a technical board would be, he said, to gain a conspectus of the whole and to have integral planning of the proration, developing technical criteria as to development of a field, and considering the effect a given program would have on the refining end.

If quotas were based, he said, upon ultimate consumer demand, as distinguished from the nomination system, certain pressures that arise from disparities between crude and refined, certain overproduction of refined products, would disappear.

In the discussion that followed Dr. Sachs' address the chief criticism was that the proposal was impractical, since there was no hope the regulatory bodies would accept it, because of the difficulty of securing appropriations and because it would introduce a new factor.

Yet at the same time there was agreement that proration fell short of attaining the equilibrium desired throughout the industry. Drastic checks became necessary because unmistakable signs had been disregarded, indicating the need for longer range consideration of the technical and economic factors involved.

President Byles had this in mind when he told his North Texas audience that proration, and with it conservation, are threatened by unnecessary drilling or overdevelopment of pools resulting in well allowables too small to permit a reasonable return. "They are jeopardized where allocation between acreage in the same pool and between different pools is inequitable. This is the most serious problem confronting alike operators and conservation authorities and can be met only by the full and intelligent cooperation of each."

Proration, if it is also to mean conservation, must be more than the weighing of allowables against nominations. It should embrace regulations in each oil-producing state, based on the soundest technical knowledge and should be governed, not by the immediate desires of any section or group, but by the long range requirements of the industry as a whole.

North Texas Oil and Gas Association Banquet

WICHITA FALLS, Tex., Feb. 28.—The annual banquet of the North Texas Oil and Gas Association Saturday evening was a fitting close to a day of felicitation over the development of the K.M.A. field. President Axtell J. Byles, of the American Petroleum Institute, and Col. E. O. Thompson, chairman of the Interstate Compact Commission, were the principal speakers. The address of Mr. Byles will be found on page 31 of this issue of The Oil and Gas Journal.

Colonel Thompson warned oil men that in their own field of governmental regulation they must not expect too much from the government.

"Oil conservation has been successful because the interests of the consumers have been zealously guarded," he said. "So far you, the oil industry, have under proration offered a constantly improved gasoline at a constantly reduced price. So long as the consumer gets that kind of service, he won't kick.

R. L. Underwood, independent operator of Wichita Falls, retiring president, presided at the banquet which was attended by 650. New officers of the association, elected at recent directors' meeting, were presented. They are: P. F. Gwynn, president; Roy B. Jones, first vice president; Homer Lee, second vice president, and J. Ed Erwin, executive vice president.

Oklahoma Supreme Court Upholds Well-Spacing Law

OKLAHOMA CITY, Okla., Mar. 1.—The State Supreme Court upheld today constitutionality of the 1935 oil well spacing law.

The act authorized the Corporation Commission to regulate spacing of oil and gas wells in state pools in the interest of conservation.

Protection of the rights of owners in a common source of oil and gas supply is included in the police power of the state, the opinion declared, and under the constitution this power may be exercised by regulating the drilling of wells into the common source and distributing the production pro rata among the owners of overlying mineral rights.

3,000-Bbl. Well in Flag Lake Field, Henderson County, Texas

FORT WORTH, Tex., Mar. 1.—Hines & Hancock No. 1 Dillard, second well in the Flag Lake field in northwestern Henderson County, was given a short production test today and appears to be good for 3,000 bbls. per day at a depth of 3,076 feet. It is in the most northern Balcones fault field, and produces from Woodbine sand.

Civil Appeal Court Upholds Seizure of East Texas Oil

AUSTIN, Tex.—The third court of civil appeals upheld the state in its seizure and sale of 160,000 bbls. of East Texas oil allegedly produced above allowables in affirming the case of Joe Dyer doing business under the trade name of Ozozo Refining Co. vs. Railroad Commission from Travis County.

Pennsylvania Oil Investigation Halted on Constitutionality

HARRISBURG, Pa.—The state oil investigating commission has been stopped from further proceedings until its constitutionality has been decided. The Dauphin County court has granted an injunction restraining the commission from contracting further debts until the case is decided. The injunction was granted on the petition of George W. Scudder, of Montgomery County.

Attorney W. B. Saul, of Philadelphia, counsel for Petrol Corp. of Philadelphia which obtained the original injunction against the oil commission on January 20, still pending decision in Dauphin court, had attempted unsuccessfully in two previous hearings to introduce Scudder's petition as an intervenor.

Judge Ralph H. Smith, of Pittsburgh, chairman of the oil commission, declared that the month's delay in hearings scheduled by the commission had already cost the state approximately $7,500.

The commission was established by the 1937 legislature, and endowed with $50,000 to survey interlocking financial relations and trade practices of oil companies.

Obituaries

DANIEL E. JORDAN, 85, Tulsa, a former employe of Sinclair Prairie Oil Co., died February 27 of a heart attack.

L. A. SMITH, Venango County, Pa., oil man, died at his home in Bullion last week. He was superintendent of the Norway-Clinton Oil Co.

WILLIAM RAWSON, 77, formerly of Petrolia, Ontario, died at Santa Ana, Calif., recently. As an expert driller, he spent many years in Australia, Borneo, Java, Egypt, Venezuela and India.

NEWTON WYLIE, 45, president of Capital Interests, Ltd., of Toronto, and Commonwealth Petroleum, Ltd., of Calgary, Alberta, died in New York recently on the eve of launching an extensive oil development program in Alberta.

JOSEPH FRANCIS MOODY, 55, an employe of the Walter O'Bannon Co., Tulsa, for several years, died February 22 of pneumonia and heart disease. A native of Illinois, Mr. Moody became affiliated with Walter O'Bannon as a mechanic and an inventor of oil-field equipment.

W. R. (TEX) JONES, 52, Wichita, Kans., oil operator, died February 26 after several weeks of illness. Before entering the oil industry more than 20 years ago, he played professional baseball with the Wichita team in the Western league, and at one time was the first baseman with the Chicago White Sox.

A. C. EBIE, 74, vice president and general manager of Magnolia Petroleum Co. until his retirement in 1928, died February 26 in Dallas, Tex., after an illness of three years. Mr. Ebie moved to Dallas in 1911 when the Magnolia company was formed. Previously he had been with branches of the Standard Oil Co. in Maryland, New Jersey and elsewhere.

WHEATON L. SOUTHERN, 51, Tulsa oil producer, died February 23. He was president of W. I. Southern, Inc., member of Southern & Thurmond, drilling contractors, and president of Ruso Drilling Co. and had been engaged in oil producing for 34 years. He was born near Clarksburg, W. Va., and procured his first job as an oil field worker when 17 years old. Two years later he moved to Lawrenceburg, Ill., where he was employed for nine years. He then joined Glen T. Braden of the Braden Oil Co. In 1912 he organized the drilling firm of Henderson & Southern, the partnership lasting 10 years. The firm operated at Bridgeport, Ill., then transferred to Augusta, Kans., and later to Eldorado, Kans. He later operated extensively at Ranger, Breckenridge and adjoining Texas fields. Subsequently he represented Leonard Exploration Co. of Washington, Pa., in Bolivia. On his return he became affiliated with Skelly Oil Co. and took charge of the company's drilling operations in the Hewitt and Wilson fields in southern Oklahoma until he formed the firm of Campbell & Southern, which terminated by the death of Campbell. They drilled wells in Mexia and in the Powell field near Corsicana, Tex. In 1935 F. B. Parriott and Southern former a partnership incorporated under the name of W. I. Southern, Inc., purchasing the holdings of the Signal Oil Co., owned by J. B. Foster in Russell County, Kansas.

THE MARKETS*

CRUDE OIL: *No price changes of more than local interest. Reduced takings by purchasers in central and western Kansas fields, along with reduced allowables and voluntary decreases in production, are having a steadying effect on the market.*

REFINERY: *Demand has failed to absorb stocks of heating oils and reduced prices are being quoted. The same trouble in a more aggravated form besets the gasoline market, although a somewhat better tone is appearing with the approach of motoring weather. Seasonal influences are improving the lubricant group slightly.*

TANK-WAGON AND SERVICE STATION: *Consumer tankcar and dealer gasoline prices reduced a half-cent in Virginia by Standard of New Jersey. Similar cuts at other scattered points. Much price-cutting reported in eastern and some other areas.*

FINANCIAL: *Oil shares went into new high ground for the current movement and held their gains fairly well. Thirty representative stocks for week ending February 26: High, 31.01; low, 29.47; close, 30.28. Week ending February 19: High, 29.50; low, 27.99; close, 29.42.*

**Detailed information in market section.*

Southwestern A.P.I. District Announces Tentative Program

Sessions on production engineering and drilling practice have been scheduled for the spring meeting of the Southwestern District, American Petroleum Institute Division of Production, at the Blackstone Hotel, Fort Worth, March 24 and 25, according to A. G. Levy, chairman of the southwestern district.

The tentative program follows, speakers not yet selected:

March 24—Production Engineering:

10:00 a.m. Presiding—W. S. Morris, East Texas Engineering Association.

Associate chairmen—C. E. Reistle, Jr., Humble Oil & Refining Co.; H. H. Hardison, Standard Oil Co. of Texas.

Developments in Cementing Practice Technique.

Pressure-Production Relationship—East Texas Field.

The Problem of Phase Relationship of High Pressure Condensate in Distillate Wells.

General Session:

2:00 p.m. Presiding—A. G. Levy, Crown Central Petroleum Corp.

The Growth and Importance of Natural Gas in the Southwest.

Administration of the Oil Industry in New Mexico.

March 25—Production Practice:

9:30 a.m. Presiding—W. E. Schoeneck, Ohio Oil Co.

Associate chairmen—L. A. Ogden, Pure Oil Co.; H. M. Staggs, Atlantic Refining Co.

Pipe for Transportation of Salt Water.

Selection of Casing Seats.

Well Treatment After Perforating.

Report of Nominating Committee and Election of Officers.

Drilling Practice:

1:30 p.m. Presiding—E. A. Wahlstrom, Goldsmith Pool Engineering Committee.

Associate chairmen—C. G. Staley, Lea County Proration Office; W. A. Alexander, Shell Petroleum Corp.

Drilling and Production Practices in the Permian Basin.

Determination of Porous Zones by Drilling Rates.

Deep Drilling on the Gulf Coast.

Marine Operations on the Gulf Coast.

R. B. Kelly, Pure Oil Co., Fort Worth, is chairman of the committee on arrangements.

Northeastern Oklahoma A.P.I. Chapter to Hear Armstrong

The Northeastern Oklahoma chapter of the American Petroleum Institute Division of Production will hold its next meeting in Tulsa March 2. F. W. Floyd is chairman.

W. J. Armstrong, chief conservation officer of the Oklahoma Corporation Commission, will speak on "The How and Why of Proration."

But One Correction Indicated

Byles Warns North Texas

By AXTELL J. BYLES
President, American Petroleum Institute

It is always a pleasure to visit the Southwest and it is an especial privilege to come here at this time when the condition of our industry and our country is not exactly what we would like it to be. If, however, we compare the condition of the petroleum industry with that of the country as a whole, we are not relatively so badly off. The distress of others gives us no satisfaction but rather calls upon us for renewed effort to correct our own weaknesses in the interest of the common welfare.

It is my understanding that about 10 years ago a few local men began advocating the formation of an association in this part of Texas through which cooperation might be attained in the solution of common problems and that, as a result, the North Texas Oil and Gas Association was organized in January, 1930.

The American way of meeting problems is the cooperative way. Cooperation comes as the result of personal contact, study and free discussion, not from mandate. It is the only way a democracy can work, which is the way of a free people.

I am somewhat familiar with the useful service this association has rendered and I congratulate you upon its strength and success and, conscious as you are that the need for it was never greater than today, I both hope and predict a continuation and enlargement of its work for you and the industry. This audience need not be told that the industry is burdened with uneconomic inventories of petroleum products.

The trend of domestic motor fuel demand during the first six months of last year was one of continuously large increases. While the demand during the month of July was not as large as some had expected, from August on demand was consistently below expectations. The refiner, accustomed as he had become to ever increasing increases in demand, did not adjust his operations to this situation, with the result that the industry ended the year with about 77,000,000 bbls. of gasoline in storage as against 63,000,000 bbls. at the end of the previous year; and the usual winter accumulation of stocks has since continued to add to the abnormal or uneconomic inventories of the year-end.

Pressing upon the refiner during most of this period has been a production of crude oil above economic requirements so that such inventories as of January 29 last were 306,190,000 bbls., as contrasted with 286,759,000 bbls. January 31, 1937. This in itself would not have been serious but for the fact that the refiner, being unduly optimistic as to demand and being desirous of keeping his crude oil connections, yielded to this pressure and accumulated a surplus of about 14,000,000 bbls. of gasoline during the 12 months referred to, which, if figured back into crude oil, would have added 32,000,000 bbls. more to that inventory. The result is a rather acute but I believe only a temporary attack of indigestion.

It would appear that there is but one correction for this uneconomic situation and that is a slowing down of both crude oil production and refinery operations pending the absorption by the market of the surpluses accumulated. This economically desirable objective would be accomplished if each individual refiner would, without delay, adjust his schedule so that his inventories will, at the end of June of this year, not exceed those which he had on hand July 1, 1937. It does not presently seem justifiable to expect more than a 3 per cent increase in domestic gasoline consumption this year over last. In view of current stocks, I think all will agree that a conservative outlook is an advisable one.

The charter or right of any industry to exist or do business is an obligation to give to the consuming public the most for the least for the longest time.

We find encouragement in the recent action of the conservation authorities of the Mid-Continent states under the leadership of Texas and Oklahoma in reducing crude oil allowables. The manufacturing branch of the industry should appreciate the situation. We realize, however, that there is little comfort to the refiner who has been compelled to cease operations, or to any one else for that matter, to say that the industry has gone through such experiences on other occasions, or in expressing the hope that the situation will right itself more promptly than heretofore. I think it would be folly, however, to expect to enjoy the usual spring increases in volume of production of crude or products under present circumstances. It is more likely that, to attain a sound economic position, the industry must slow down operations throughout all of the first half of the current year.

Underlying the recurring problem of overproduction of products is, of course, the production of raw material itself. I am of the opinion that the most important contribution remaining to be made toward the permanent solution of this problem lies in proper well-spacing, with due emphasis given to the acreage factor. When one views in retrospect the progress achieved along these lines during the past few years, he need not lose heart or look forward to the future with apprehension. The old argument as to whether the ultimate yield per acre is increased by a close well pattern, as distinguished from a wider well pattern, will probably go on far into many another night, and so it should, for fields differ as to the treatment required, but if, as I believe, the people of this country are entitled at our hands to the most for the least for the longest time, the cost of recovery must be considered along with the volume recovered. If, for example, a 10-acre drilling pattern would yield 80 per cent as much petroleum as a 1-acre pattern, it would not be in the public interest to spend 10 times as much to recover 100 per cent as it would cost to recover 80 per cent. Nor is it to the interest of the producer himself who, like the public, profits most from the recovery of the most barrels per acre at the lowest cost. Abundance of supply is of little use if the cost required to produce it seriously impairs that use.

We will refer a moment later to the nation's petroleum reserves which, notwithstanding the tremendous increase in demand upon them, now stand higher than ever in the history of the country. We are not afraid of but are thankful for this assurance of supply. We welcome discoveries which will increase the insurance of abundance. Our danger comes not from too large reserves but from too rapid development of discovered reserves, with useless cost both to the consumer and the producer incident to excess drilling.

Proration, in spite of the misunderstanding of some as to its necessity, is the foundation and very life-line of conservation. It alone offsets the enemy of conservation, which is the old rule of capture. Proration, and with it conservation, are threatened by unnecessary drilling or overdevelopment of pools, resulting in well allowables too small to permit a reasonable return on the risk and expense involved. They are jeopardized where allocation between acreage in the same pool and between different pools is inequitable. This is the most serious problem confronting alike operators and conservation authorities and can be met only by the full and intelligent cooperation of each.

The industry has learned that the most important factor in the production of petroleum is the conservation of underground energy, whether gas or water. In other words, the maintenance for the longest time of the most efficient and economical bottom-hole pressure. The industry must learn to

*Before the Annual Meeting of North Texas Oil and Gas Association, Wichita Falls, Tex., February 26.

appreciate the vital importance of well-spacing. That you gentlemen are aware of the necessity and of your responsibility for applying sound well-spacing and production practices to the great K.M.A. field which surrounds you, I have no doubt. In this room are students and pioneers in all of of the practices to which I have referred. I hope you will not permit the years of labor, sacrifice and education which you have experienced to be wasted in the instant case, but will endeavor to emulate or excel the best practices in any field, so conducting your operations that you will contribute your full share toward the survival of the 15,000 stripper wells which years ago pioneered the upper sand of this locality. Such an outcome is simple justice to the owners of these stripper wells and essential conservation in the public interest.

There are a number of directors of the American Petroleum Institute in this audience. To them, and other members of the board, was recently sent a report of the board's Committee on Well-Spacing and a report of the Legal Subcommittee, with a request for comments. The replies so far received leave no doubt as to the interest of the board in these studies and when the reports are released for publication, either in present form or with such revisions as discussion may indicate to be desirable, it is thought that they will fully justify the effort expended in their preparation.

It would ill fit this, or any similar occasion, should one fail to pay tribute to you, and thousands of other producers of petroleum, for the serious study which you have given and are continuing to give these problems; and to the conservation authorities of the several states for their like efforts. To an audience such as this, no explanation is required as to the necessity for these controls over the production of petroleum which, by reason of its fugacious nature, is as different from every other raw material as its proper conservation is essential to the life of the nation. Conservation does not mean locking up petroleum in the earth, which would destroy its usefulness, but it does mean ever improving production practices and prudent use. To paraphrase a slogan with which you are familiar, "We can afford to use, but not to waste."

In view of the recent recurrence of pessimistic statements concerning the adequacy of our petroleum supply, the release of the report of the Institute's Committee on Petroleum Reserves (filed February 3, 1938) is timely. This indicates, as you know, proven reserves of 15,500,000,000 bbls., a high for all time. In spite of our best efforts, misunderstanding persists as to the meaning of these reserves. They are still viewed by some as a limit of our possible production over the years to come. The fact is they are simply the present proven underground inventory recoverable by methods now in use from fields already discovered and do not take into consideration any additional reserves available from the hundreds of millions of acres of land as yet untested, or the reserves lying below present producing horizons which are, as everyone knows, constantly being brought into production through deeper drilling.

Perhaps clarification will be aided by asking how many other industries are carrying inventories either on their shelves, or under them, which will supply the public need for so many years. The fact should be emphasized and reiterated that the present proven reserves do not represent the end of recoverable petroleum in this country. We have both historical and scientific bases for the confidence that production will continue to be found in abundance for an indeterminable time to come. The scare of scarcity commenced with the beginning of the industry and probably will continue to the end. There seems to be less justification for it today than ever before. Improvement in the technique of discovery, development and production constantly lengthen the life of the reserves, both discovered and undiscovered.

Even more amazing than the conservation achievements of the discoverers and producers of petroleum are the contributions to conservation made and being made by the refining branch of the industry. The development of the cracking process enables the manufacturer to supply twice the amount of gasoline from the same amount of crude oil which would have been necessary a number of years ago, and, as unbelievable as it may seem, the fact is that, but for this refining technique, it would have taken more than one billion barrels of additional petroleum to have satisfied the country's 1937 demand for products. To use the familiar football vernacular, the refiners who get little credit for conservation may be likened to the linesmen on a football team who get little credit from the uninformed, though they make possible the brilliant performance of backfield men. It sometimes occurs to me that you production halfbacks assume all the credit for conservation when, fine as your record is, your faces should be red when your performance is compared with the performance of the refinery linesmen.

The use of the polymerization process, which is already producing large quantities of gasoline without any additional consumption of crude oil, is as yet in its infancy. If I may invade the dangerous field of prediction, I will venture the guess that some day, when economically desirable, what to you producers today would seem a disturbing amount of gasoline will be recovered from natural gas, and back of all this lie the vast sources of supplemental motor fuels produced through the liquefication of coal and oil derived from shale.

This assurance of supply does not justify for a moment, wasteful practices in the production of petroleum or in the manufacture of its products but there is no waste of this priceless possession in its current and full use to supply the needs and the comfort of people living today and tomorrow.

While I may be permitted to remind you that the refiner and marketer in distant states afford the Southwest the larger part of its market for petroleum and that self-interest should lead the producer so to conduct his business as not to place an undue share of the burden upon the refiner and marketer, wherever he may be, I likewise remind you that you have the right to give similar advice to them.

The plight of the refiner, particularly in the old Group 3 area, who is dependent upon purchases for his supply of raw material, is at the moment far from a happy one. He might get temporary relief from lower priced crude but not for long, as the entire refined products market structure would follow it and he, with every one else, including the consumer, would not, in the long run, profit from a breakdown which would result in physical waste in the producing fields and economic waste all along the line. The refiner, to whom I have referred, might get immediate relief from an increase in commodity prices but that could not be accomplished against an oversupply even if the law would permit agreements to this end. After all, no one really familiar with this business could nurse the fantastic delusion that such agreements could be arrived at or would be respected in so vast and competitive an undertaking. The refiner can get relief only by the slowing down of the production of both petroleum and its products until burdensome surpluses are absorbed. Such relief should not be very long in following economic operations. But the application of this sound policy will bring relief only so long and as permanent as the continuance of the policy itself—and no longer.

The statistical position of the industry is currently available to anyone who will read the trade journals or the newspapers. An operator in any branch of this business who does not watch for, read and heed these figures is about as foolish as a navigator who throws away his chart, sextant and compass and then attempts to sail the seven seas. Sooner or later he ends up in trouble. I would not shed tears over the fate of such a sailor but I would sympathize with his passengers and crew and with other ships with which he might collide.

Neither time nor your patience will permit more than a passing reference to the artificial handicaps which are ever being attempted to be imposed upon this industry. The crop this year seems a little larger than usual. For example, we have confronting us in congress an attempt by local interests to penalize one industry for the benefit of another in the form of a proposed 1-cent tax per gallon upon fuel oil. This tax, which is estimated at $168,000,000 per annum, would be superimposed on an estimated tax of $1,340,000,000 on the property, operations and products of the petroleum industry. There is such a thing as killing the goose that lays the golden egg. While this situation is our concern, it is becoming increasingly evident that it is also the concern of a million and one-half home owners who enjoy the comfort and economy of fuel oil heat and are entitled to it, to the steamship companies, manufactured gas companies, railroads, and consumers generally, as well as to over a million employes of the petroleum industry who are asked in this arbitrary and uneconomic manner to give doubtful aid to those of another industry. The expression, "doubtful aid," is used advisedly, for what practical person could doubt that the penalty thus attempted to be imposed on one fuel would not promptly be added to the consumer's cost of both fuels, with resultant decline in the consumption of each.

We desire to aid every industry in every practicable way and this aid will come surely and soundly rather through cutting deeper into the

(Continued on Page 34)

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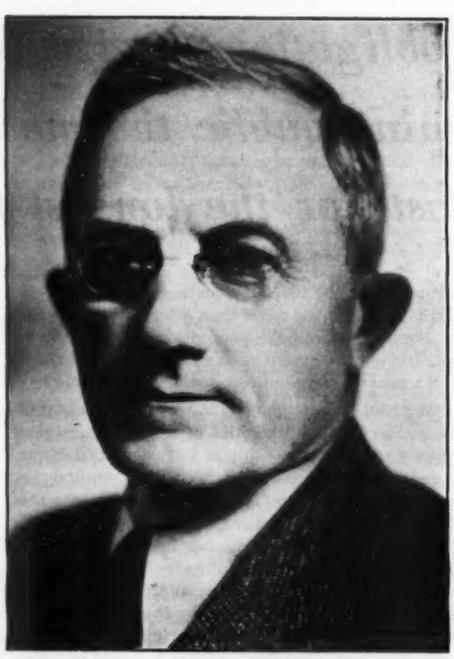
Will Head Refinery Committee At Petroleum Exposition

C. M. Boggs, president of Kanotex Refining Co. of Arkansas City, Kans., has been selected by President W. G. Skelly as the chairman of the refining committee of the Tenth International Petroleum Exposition to be held in Tulsa May 14 to 21. Mr. Boggs' committee will have charge of the "Refiners Day" program.



C. M. BOGGS

A report to date reveals that 303 manufacturing firms will have exhibits showing the latest equipment and developments in the refining industry, Mr. Boggs said. The new Hall of Science will have a working model, constructed of glass, showing actual operation of a modern refinery, as well as many other refining developments.

Sudden Mystery About Submerged Lands

WASHINGTON, D. C., Feb. 28.—A sudden and somewhat mysterious interest by the federal government in petroleum deposits under submerged lands within the 3-mile limit along the coasts drew a large gallery of witnesses and spectators to a hearing held by the house judiciary committee last week.

Government witnesses appeared to be very anxious to get control over submerged oil lands, although they advanced few very convincing arguments why this should be done. The committee was considering Senate Joint Resolution 208, introduced by Senator Gerald P. Nye of North Dakota, which passed the senate last session without any explanation. It had been lying unnoticed before the house committee until suddenly hearings on it were ordered in a way which hinted that national defense is in some way involved. The measure would instruct the attorney general to institute proceedings for establishing the title of the United States to submerged lands within the 3-mile limit along the coasts and to petroleum deposits contained in them. Such action would lead to a great deal of litigation, and it is not believed the committee will make a favorable report on the measure.

Throughout the years, according to testimony at the hearing, various states have assumed that they owned the tidal and submerged lands adjoining their coasts. They have issued permits for petroleum prospecting and drilling on these lands, regulated fishing off their coasts, and granted municipalities the right to administer certain areas as harbors and ports.

The federal government has had no apparent interest in such proceedings. Various departments, indeed, have refused to have anything to do with them on the ground that they did not have jurisdiction. The Interior Department has refused to grant permits for oil well drilling because it said it had no jurisdiction, and the War Department has advised applicants for harbor development that certain projects would or would not interfere with navigation, without showing any further interest.

Burning Issue

Last week, however, the question of ownership of the submerged and tidal lands along the coasts became a burning issue. The hearing before the house committee developed a burst of oratory on states' rights, some potent arguments as to why the states believe they own the lands, and the fact that certain federal government departments, while uncertain that they have any claim to the lands, would like to own them.

As the hearing opened, Senator Nye appeared with a revised version of the resolution, which he said had been prepared after consultation with interested departments of the government. The amended measure declares the conservation of petroleum deposits underlying the submerged lands "is essential for purposes of national defense and the future maintenance of the navy," and directs the president to set aside as naval petroleum reserves all such deposits or lands which are likely to contain oil deposits subject to any superior right or interest that may be recognized "in the judicial proceedings hereinafter authorized." When such reserves have been set aside, the attorney general would be directed to institute judicial proceedings to establish title of the United States to the submerged lands thus reserved, with the provision, however, that nothing contained in this resolution shall be construed as a taking of property by eminent domain.

The original resolution did not mention the navy, naval petroleum reserves, or national defense, but directed the attorney general to assert and establish title to the lands.

Supporting the measure was a group of witnesses including representatives of the navy, interior, and justice departments, and a number of drillers and other individuals in California. All these witnesses declared there should be an immediate judicial determination as to ownership of the lands, to erase the confusion that now exists.

In addition, the Navy Department presented an elaborate argument to show that congress has jurisdiction over such lands under its powers to regulate commerce and to maintain a navy. If congress has power over navigable waters for regulating commerce, according to the testimony, it may also take the lands under the waters for other purposes. The witness pointed to incidental powers of congress which have grown up from its jurisdiction over navigable waters, such as the right to regulate the height of bridges over such waters. He then argued that the appropriation of submerged lands containing oil might be considered an incidental power of congress on the ground that the navy may need the oil for national defense, including the maintenance of foreign commerce in time of war.

When a member of the committee asked the witness if he was arguing that the lands should be set aside for naval reserves on the ground that the navy needed the oil or on the ground that the United States had a right to the land, he answered, "Both."

States Protest

On the other side of the question were representatives of Texas, Louisiana, Florida, New York, and Mississippi, and of various port authorities.

The Texans reminded the committee that their state came into the union as a republic, owning all of its public lands, and that it has never ceded any of its tidal or submerged lands.

When the first oil well was drilled in Galveston harbor, according to one witness, an appeal was made to the commanding army officer of that area for a ruling on whether the project would be a menace to navigation. Following a hearing in Galveston, the officer ruled it would not, and showed no further interest in the proposed well, and subsequently other officers in charge have followed the same course.

Representatives of New York, Mississippi, Louisiana, and Florida told the committee their states have for years made grants of title to submerged lands for various purposes, with the acquiesence of the federal government. In many cases the proposals have been referred to the War Department, which has ruled on the possibility of interference with navigation or commerce, but has never asserted any further jurisdiction. The resolution as now worded, they said, would affect millions of dollars of investments.

BYLES WARNS

(Continued from Page 32)

heavy end of the barrel of crude in order to supply the demand for distillate fuels for home-heating, thus letting coal replace, for industrial land uses, that part of the market which has been preempted by heavy fuel oil. This is the sound solution and contributes to conservation through higher use.

We still have with us periodical efforts for the divorcement of pipe lines and marketing from refining and production, suggestions for the repeal of the Connally act and the Interstate Compact, discontinuance of the Bureau of Mines forecasts of consumptive demand, destruction of the powers of the state conservation authorities, which would result in chaos, waste and the squandering of the nation's petroleum reserves, not to mention an increasing number of investigations by state authorities, which may result in recommendations for licensing of service stations and jobbers, arbitrary grading of gasoline, price fixing under its own or some other name, and many other burdens and limitations which, even without the intent of their proponents, would tend to disrupt and destroy the efficient operation of one of the basic industries of the nation; one which has steadily given the people an abundance of essential products of constantly improving quality and service at constantly lower prices,

Cries of distress are now heard from all parts of the land. We are thankful that these are relatively fewer in this than in most industries. How simple it would all be if this, instead of being a world of hard and practical reality, were fairyland wherein, by the wave of a magic wand, all grievances could be alleviated, injustices removed and the way made easier for all. Personally, I do not believe in fairies, nor have I any faith whatever in the efficacy of wind-waving, magical or otherwise, but my faith in work and thrift, study and practical experience, and in the old-fashioned virtue of plain common sense, remains unreformed.

Earnestly as I desire it, I do not see relief for the distress of a nonintegrated refiner under circumstances such as exist at the moment other than by the processes heretofore mentioned. Everyone wants him to live and prosper. If his setup and business methods are sound he renders material contribution not only to the industry but to the public. He is needed and must be saved.

I cannot tell you how to alleviate the difficulties of some jobbers and marketers whose business has grown up under the fixed margin, or guaranteed profit system, which, in turn, encourages the mushroom growth of others, unless by the same competitive processes which apply to all other merchandising. I am satisfied that the answer is not the one which is being advocated by some, namely, the licensing of filling stations and of jobbers, or by price-fixing, or by any of the other artificialities which would require an enforcement army larger than the present army of federal and state employes and lead ultimately to the substitution of political preference and political experience for that of life-time training.

If we will steer our course steadily by the pole star of the public welfare, which I conceive to be the most for the least for the longest time, we cannot go far wrong.

Control of the production of petroleum through cooperation between the producer and the state conservation authorities is indispensable to prevent waste of this irreplaceable and essential natural resource. Petroleum, by reason of its fugacious nature, as heretofore stated, is a thing apart in this respect from any other raw material on, in or under the earth, and must be treated accordingly.

When I reiterate my economic creed and what I consider to be the charter or right of any industry to exist or do business which is an obligation to give to the consuming public the most for the least for the longest time, you will understand that, indispensable to this program, is an earning power sufficient to pay reasonable wages, provide good working conditions and yield a reasonable return upon the capital essential to this service. To give an illustration from our own industry: the present price of petroleum is relatively below that of other products and will remain below its intrinsic worth until the petroleum industry becomes a chemical industry along which lines it is already making substantial progress. I am not advocating higher prices for petroleum under present circumstances. I am aware that should proration for long break down, prices would go with it and for a time the public might be deluded into the belief that it was profiting. But this would mean the most for the least for the *shortest* time, as it would involve the destruction of tens of thousands of stripper wells, the production of which constitutes one of the nation's important reserves, a stoppage in the search for new production, which is essential to the maintenance of supply, and the criminal wastage of reservoir energy in the great pools which would run wild in an attempt to get sufficient volume to let the producers live on what might prove to be a 10 or 25-cent per barrel market. Would such a situation benefit the nation or bring anything but disaster to all concerned excepting quick and temporary fortunes to the small groups of vultures which feed off the carcasses of the dead?

It is true that this a Big industry—could any sane person doubt that it has to be big to do its job? It is composed of many big and small companies and thousands of individual operators who, under the lash of a highly competitive system, have achieved a miracle of service to the consumer while paying over a billion dollars a year at one of the highest wage rates in history on the basis of the shortest hours for labor; and, at the same time contributing through taxation on its property, products, and operations to the support of government in an amount aggregating over 10 per cent of all state, federal and local taxes. If one were inclined to be cynical he might find in the constant political attacks and harassments from other sources an excuse for cynicism, but cynicism embitters the heart and clouds the mind and serves no useful purpose.

If this industry has failed in anything it has failed in its attempts to obtain public understanding of its problems and its services. The achievement of this goal is a slow and difficult one, but it can and must be attained. When the public understands what it is all about and what is necessary to create, maintain and increase the national wealth which means nothing less than the creation of work, the maintenance of the living of a people, and the raising of the standards of that living, many of the things which are being done and most of the things which are threatened will, if the economy survives, look very much like the actions of small boys, to one of whom has been given a watch for Christmas and all of whom are taking it apart to see what makes it tick, and none of whom know how to put it together again.

With the fate of the nation literally in balance as to its fiscal position and its basic policies, this is no time for bitterness or despair, but it is a time which demands clear thinking, steady nerves, high courage, and sound and unselfish judgment. Our greatest opportunity for direct service to our country lies in the application of such of these qualities as we possess to the problems of our own industry, which is so essential to the nation and contributes so much to its wealth and its general welfare.

It has been pointed out by other and much abler annalists than I that it will not be long until we shall clearly see whether the country will continue to operate under its historic competitive capitalistic system, or under a governmentally supervised monopolistic capitalistic system. If the latter of these alternatives result let no one for a moment doubt that it will quickly lead to a state capitalistic system and from thence into state socialism. Any student of ancient or contemporary world history can have no doubt on this subject.

These comments are not as irrelevant to this occasion as may at first appear, for no industry has ever enjoyed a freer field for personal initiative, or required it, or shown greater willingness to meet this opportunity with financial risk. The very symbol of its origin is the wildcatter. The competition which he started exists to this day in every branch of the business, from the work of the field scout and seismograph operators to the sale of the last quart or ton of petroleum products to the ultimate consumer. By these processes, this business has been able to meet the ever mounting demand for its services, and only through their continuance can the nation's requirements be met.

What I have said may seem unduly pessimistic, but it is not so intended. If there are citizens of our country who are more courageous and have had more experience in the school of hard knocks and abuse than the men in the oil industry, I do not know them. If there are men more generous and more willing to sacrifice and cooperate in the service of their country and their industry, I do not know them. If there are better citizens in America, either in public or private life, than the rank and file of the personnel making up this industry, I do not know who they are. In these times, in which the only certainty seems to be uncertainty, if the the men of this industry will stand shoulder to shoulder, keep the faith and fight the good fight, carrying their message to the people of the country, to their representatives in Washington and in the states, they will further the application of good judgment to their own and the nation's problems and contribute that rarest and most needed of all qualities, *plain common sense.*

SIMPSON DISCOVERY

(Continued from Page 27)

failed to produce. Later Mid-Tex Oil & Gas Co. drilled a well 1 mile east of the Beans location, which produced some oil and gas from the Ellenburger before being plugged.

In terming the present producing horizon the Simpson lime, H. H. Adams offers in justification that known fossil remains are older than Mississippian, yet not so old as the Ellenburger. The formation is about 60 per cent soluble in acid. It is producing from a zone about 80 feet higher than found in Beans No. 1, which is considered to have been producing from the Ellenburger as no organic matter was evident in the lime.

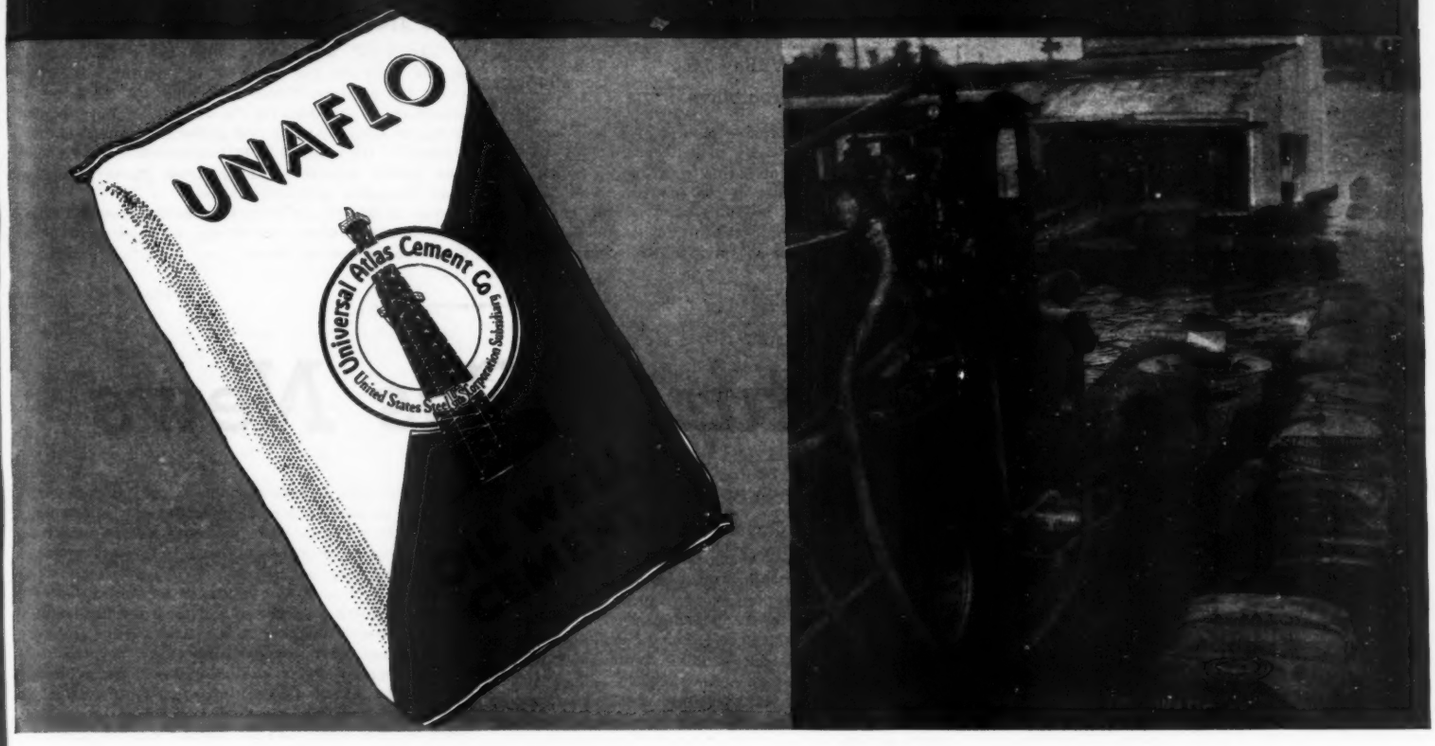
Hal Hughes and associates hold a block of about 8,000 acres, and plan an immediate development campaign. Those associated with him are Oscar Cooper and Harold Weeks of New York City; Eugene Clark, W. Tracy Gaffey, H. F. Alexander, W. E. Ball, Louis Cass, J. H. Bloch, H. D. Carey and F. P. Graves of Los Angeles, Calif.

Secretary Ickes Comments Tartly on Oil Situation

WASHINGTON, D. C., Mar. 1.—Secretary Ickes today said that sooner or later there will be recognition of the national interests involved in stabilization of the oil industry and if the federal government can cooperate with the states to this end it should be done in the interests of conservation. He added that he knows of no legislation to accomplish this. He does not expect to propose any, and there is no administration bill on the subject.

His expression was made at a press conference when asked about the flood of complaints from Texas about overdrilling and heavy gasoline stocks. He replied that what the complainants want done cannot be accomplished without legislation and, because of the Madison case, he is referring all such correspondence to the department of justice. He added that the Connally act is working successfully but it covers only one aspect of the problem. Asked if he would welcome new legislation, he replied that depends on what kind, adding that for several years the department proposed legislation only to be opposed by oil interests. He declined to comment on Alexander Sach's proposal for a nonpolitical technical board to supervise the oil industry.

YOUR CEMENT HAS TO HAVE PLENTY OF WHAT IT TAKES–



To do a good job under conditions like these

● This was a barge job in southern Louisiana.

1165 feet of 5-inch liner had to be cemented in a hole that was *sidetracked.*

Liner was run on 4½-inch drill pipe using a packer-type setting tool. Temperature at the bottom of the hole was 185° F. 200 sacks (the first part) of Unaflo were mixed 16 3/10 lbs. per gallon. The last 50 sacks were mixed 16 9/10 lbs. per gallon.

Extremely heavy slurry—yet the cement was pumped at a pressure of only 600 lbs. per square inch! When drilled out later the cement was exceptionally hard.

On jobs everywhere operators are getting excellent results with this easy-to-pump, retarded set oil well cement. Unaflo flows freely into position, then sets hard as a billiard ball to form a tight shut-off against water and gas. You'll like Unaflo. Try it on your next job, and see!

Universal Atlas Cement Co., United States Steel Corporation Subsidiary. Amicable Bldg., Waco, Texas; Kansas City; Tulsa; Oklahoma City.

A Cement for Every Oil Company Use at Oil Well, Refinery and Filling Station

Atlas portland cement for *surface* work and for cementing *surface* casing. Unaflo cement is recommended for *deep* well work.

Lumnite cement is used in Oil Refineries for making Refractory, Insulating and Heat-Resistant Concrete Linings in Still Furnace Walls, Bottoms, Roofs, Foundations, Ducts, Flues and Stack Linings; Tube Sheet Insulation.

Lumnite cement makes Corrosion-Resistant Concrete and Mortar Lining in Distillation and Cracking Units; Re-Run Stills; Absorption Systems; Chemical Treating and Ethyl Plants.

Atlas White the cement that is pure *white* and non-staining. Exceeds specification requirements for portland cement strength. Ideal for ornamental work in connection with service station construction and repair.

USS

Universal Atlas
CEMENTS

Pipe Line Activity

Manager of Shell Pipe Line Co.

R. B. HIGH

R. B. High, for the past four years manager of the manufacturing department for the Shell Petroleum Corp., has been appointed manager of the Shell Pipe Line Corp., succeeding R. F. Smith who resigned.

When Mr. High started his Shell career in California in December, 1913, he was first employed as an engineer engaged in pipe line work. Going to the Wood River, Ill., refinery in March, 1917, he was placed in charge of construction there in January of the following year. Subsequently he served as superintendent of four of the company's five refineries, namely those at Arkansas City, Wood River, Norco, La., and Houston, Tex. This preceded his appointment as manager of the manufacturing department in January, 1934.

At the present time the company is constructing a gasoline pipe line between the Wood River refinery and Detroit by way of Indianapolis.

Phillips Buys Barnsdall Seminole-Okmulgee Line

Phillips Petroleum Co.'s pipe line department has purchased the 48-mile 6-inch pipe line of Barnsdall Refining Corp. from the Seminole field, Oklahoma, to the Okmulgee refinery now shut down. The Phillips company took up for use elsewhere its own 4-inch line from Seminole to Okmulgee.

Bell Oil & Gas Co. Purchases Pipe Lines in Burkburnett

Bell Oil & Gas Co., Tulsa, announces it has purchased the gathering system of Continental Oil Co. in the Burkburnett area and the pipe line of Continental running from Burkburnett to Wichita Falls, Tex. It also purchased some of the shallow production of Continental in the south Burkburnett field containing some 31 producing oil wells. The purchase ties in with the Bell system which extends over North Texas and into the Bell line to its refinery at Grandfield, Okla.

Bell also announces that the Bell General Transit Corp. line is in operation between the East Texas area and the main line of Pure Oil Co. and that at present 15,000 bbls. are going through the line to Bullard station daily. The Bell General Pipe Line Co. terminal at Smiths Bluff, Tex., is now in operation. Albert Finston, vice president of Bell is president of Bell General Transit Co., and D. D. Irwin, vice president of Pure Oil Co., is vice president of the Transit company.

Cost of Turner Valley Line To Tidewater Prohibitive

TORONTO, Ontario.—Reports of a proposed pipe line from Turner Valley to deliver crude to the Imperial Oil refinery at Sarnia were denied by G. Harrison Smith, president of the company, who declared the cost would be prohibitive. "We now have pipe line connection from Texas to Canada and we can get oil there much more cheaply," he said. "In any event, there is not sufficient oil flowing in the Canadian West to warrant any such undertaking."

Cost of a line from Calgary to Regina alone has been estimated at $25,000,000. A counter proposal of a pipe line from Turner Valley to the Pacific Coast has also been suggested, but is subject to the difficulty of traversing the Rocky Mountains.

Negotiations for Purchase of Pure Transportation Line

SAGINAW, Mich.—Negotiations were in progress at the week-end for purchase by Simrall Pipe Line Corp. and Michigan-Toledo Pipe Line Co., the latter a subsidiary of Standard Oil Co. of Ohio, of Pure Transportation Co.'s pipe line and gathering system serving Michigan's Buckeye oil field in Gladwin County. The line, 6-inch, extends 30 miles from Buckeye to the Pure Greendale pumping station.

Sale of the line by Pure Transportation would take Pure Oil Co. entirely out of the Buckeye picture, as it has no production there.

Natural Gas News

New York Wildcat Blows in: 11,500,000-Foot Gasser

BRADFORD, Pa.—A wildcat gas well of the Belmont Quadrangle Drilling Corp. of this city, located in Allegany County, New York, drilled itself in with a daily production of 11,500,000 feet.

The well is on the Fred Hilligas farm, Beach Hill, Willing Township, about 12 miles southeast of Wellsville.

The drill penetrated 3 feet into the Oriskany sand, with total depth 4,825 feet. Pressure was gauged at 1,975 pounds.

The company plans to hold the gas supply in reserve, and contemplates no additional drilling in the area at present. Pipe line will not be laid to the well until summer, according to present plans. The Belmont corporation has three farms in the vicinity of the well.

Interstate Commerce Commission Rules on Carbon Black Rates

WASHINGTON, D. C.—The Interstate Commerce Commission has found the proposed increased rate on carbon black from the Monroe (La.) district and Texas and Oklahoma producing points unjustified and ordered the railroads affected to cancel the increase by March 25.

At the same time, the commission found that increased charges on shipments of the commodity from the same producing points to Gulf ports for export or coastwise movement, were justified.

The increases were filed to become effective April 20, last, and would have raised shipping charges 5 cents a pound on carbon black in carloads to points in the United States and Canada, principally to the middle western tire manufacturing points, and the same boosts on the commodity to Gulf ports for water shipment. Various producers and consumers protested, hearings were held and examiner's report submitted, to which both the railroads and protestants objected, and oral arguments were held. The commission's action is the result of this proceeding. In support of the boosts in the export shipments, commission said present rates are lower than it could lawfully require carriers to maintain.

Panhandle Sour Gas Hearing Adjourned Until March 7

AMARILLO, Tex.—Little progress was made in the Panhandle's first sour gas hearing conducted by Commissioner E. O. Thompson. After introduction of some evidence it was decided to adjourn the hearing until March 7, at which time all members of the commission can be present. The questions were so involved it was thought desirable to have full representation of the regulatory body.

Phillips Petroleum Co. petitioned for a proration order affecting the sour gas area of the west Panhandle. Issuance of such an order at this time was opposed by practically all other sour gas operators. The principal reason advanced against the order was that the sweet gas order issued about 60 days ago for Wheeler County is inoperative at this time on account of an injunction order by the court, and no similar steps should be taken until final ruling on the original order had been returned.

The Phillips company attorney rested his case upon the fact that the legislature had enacted a separate law applying only to the sour gas area that has no relation to house bill 266 except in a mechanical way and therefore the delay in issuing the order was not justified.

Lone Star Gas Corp. Reports Gain in Income

PITTSBURGH, Pa.—The Lone Star Gas Corp. and subsidiaries report consolidated net income of $6,820,788 after all charges but before surtax, equivalent to $1.13 per share on the 5,537,717 shares of common stock, after preferred dividends were paid. It compared with $6,192,632 or 99 cents a common share in 1936. Preferred dividends paid declined $288,555 to $518,728.

Gross revenues were $21,045,799, an increase of $959,000, while expenses jumped $830,140. Depreciation and depletion charges increased $228,572 to $2,747,977.

Alberta Asks Amendment to Conserve Turner Valley Gas

OTTAWA, Ontario.—N. E. Tanner, minister of lands and mines for Alberta, states the Alberta government is negotiating with the federal government for an amendment to the natural resources agreement to give the province the right to pass legislation to conserve the gas resources of Turner Valley.

Mr. Tanner states that in November, 1937, "the value of oil recovered was little above the value of the gas used to produce it." Since the discovery of crude on the west flank, conservation of the gas now wasted has become much more important.

In addition to the ultimate recovery of the gas for domestic and industrial purposes, it now has a greatly

enhanced value as a lift for the production of crude oil; for holding back the crude from migrating into the gas zone where it may be lost; and to retard any possible water-flooding of the west flank.

Alberta passed the Turner Valley Gas Conservation Act in 1932 but the courts held it unconstitutional so far as it affected leases granted by the Dominion before the transfer of the natural resources to the province. Some of the Alberta crude producers have agreed to a 2½ per cent production levy to compensate owners of gas-naphtha wells should these be closed; and the amendment of the Dominion-Alberta natural resources agreement is sought to enable the province to pass legislation to facilitate the closing of naphtha wells and the proposed compensation levy.

Texas Commission's Authority Challenged by Denning

The Texas Railroad Commission recently entered an order declaring its authority to exercise original jurisdiction in fixing gas rates in incorporated cities and towns in Texas, but only when requested by the town governing body.

Denial that the railroad commission has the authority to exercise original rate fixing jurisdiction in incorporated cities and towns was made by L. B. Denning, president of Lone Star Gas Co., in the following statement:

"The statement issued by the Texas Railroad Commission concerning the commission's authority to fix gas rates in incorporated cities and towns is misleading.

"We deny that the railroad commission has the authority to exercise any original jurisdiction in incorporated cities and towns. Original jurisdiction over gas rates is vested in the cities and towns by statute. The commission can only exercise appellate jurisdiction in such cases. This proposition has been definitely settled both by statute and judicial decisions in Texas. The procedure suggested by the commission will result only in extravagant litigation and useless waste of the funds of both the taxpayers of the state and the gas consumers.

"The commission's investigations into the rates of the companies comprising Lone Star Gas system have in many instances resulted in increased rates. In some instances the increases were put into effect pursuant to court orders and in others by the commission itself.

"In all cases where the commission has attempted to reduce the company's rate, extended litigation has resulted. Only three cases have been tried to date. In one, the federal court held for the company. In the other two, juries in the district court at Austin found the orders of the commission unjust and unreasonable."

Refinery Projects

British American Enlarging Montreal East Refinery

MONTREAL, Quebec.—The British American Oil Co. has initiated construction work on a $500,000 extension to its refinery at Montreal East.

Richfield to Build Rerun Unit at Watson, Calif.

LOS ANGELES, Calif.—Richfield Oil Corp. has let a contract to Bechtel-McCone Corp. for the construction of a rerun unit at Richfield's Watson refinery. The rerun unit will be of the single-flush type having a capacity of 8,000 bbls. a day. Cost of construction is estimated at in excess of $100,000.

Rebuilt California Plant Placed in Operation

LOS ANGELES, Calif.—Reconstruction of the old Seager refinery at Oildale into a modern lubricating oil plant with a capacity of 500 bbls. daily has been completed by Airlane Petroleum Corp. of San Francisco. Destroyed by fire two years ago, the Seager plant was taken over by Airlane and rebuilt. Airlane Petroleum Corp. is headed by Mrs. Fred T. Murphy of San Francisco. John H. Bailey of Bakersfield is vice president; A. Senderman of San Francisco is secretary-treasurer, and J. H. Fuller of San Francisco is general manager.

Work on Continental Crude Units Nearing Completion

DENVER, Colo.—Construction work on Continental Oil Co.'s new crude distillation units is nearing completion and they are expected to be placed in operation about March 15. Completion of the new units will increase the plant's daily crude capacity from 2,000 bbls. to 5,000 bbls. Approximately $400,000 is being expended on the enlargement program.

Plan Refinery for Ellis County, Kansas, Pool

WICHITA, Kans.—Construction of a 6,000-bbl. refinery in the Bemis field of northeastern Ellis County, Kansas, is planned by a group of 10 independent oil producers, according to C. H. Lebow of Los Angeles, Calif., and Wichita. Lebow said plans will be withheld until application is filed and acted upon by the Kansas Corporation Commission granting sufficient allowable to operate the proposed refinery.

Present official allowable for the Bemis pool, comprises only 1.89 per cent of allowable in addition to "pipe line proration." At present the field comprises 158 wells with a combined daily potential of 344,385 bbls. but the daily allowable averages only 8,882 bbls. based on a monthly allowable of 266,472 bbls.

California Gasoline Sales Decrease During January

SACRAMENTO, Calif.—For the first time in almost a year gasoline sales showed a decrease in comparison with the same month of the previous year, the State Board of Equalization reported. Gasoline sales for January amounted to 126,764,626 gallons, on which a tax of $3,802,938 was levied. This tax represented a reduction of 1.37 per cent as compared with the income of January, 1937. It also was $326,180 less than the amount collected in December, 1937. Inclement weather throughout the state was blamed largely for the January reduction.

Natural Gasoline

Warren to Increase Capacity Of Monument Field Plant

Warren Petroleum Corp. has announced that it will increase the daily gas-handling capacity of its Monument, N. Mex., gasoline plant by approximately 30,000,000 feet. Distillation equipment for the increased manufacture of butane will also be installed. The plant, which is of the absorption type, at present has a gasoline capacity of 50,000 gallons daily.

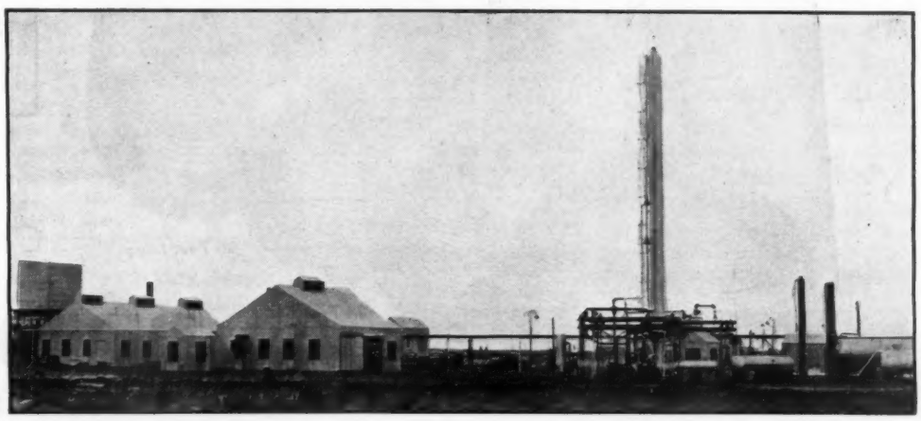
West Texas Gasoline Plant Completed by Barnsdall

Barnsdall Oil Co. has completed construction of its new natural gasoline plant in the Foster field, Ector County, West Texas, and has placed the plant in operation. The plant is about 5 miles west of Odessa and 3 miles from the Texas & Pacific Railroad, to which the gasoline is moved for shipment. Daily gas capacity of the plant is about 12,000,000 feet, although at present it is processing some 6,000,000 feet.

Standard to Process Portion Of Long Beach Harbor Gas

LOS ANGELES, Calif.—Lomita Gasoline Co. has completed a deal whereby Standard Gasoline Co. will handle several million feet of gas daily in its Signal Hill gasoline plant since Lomita is unable to handle the entire flow of Long Beach Harbor gas. Lomita has likewise completed a similar arrangement with Signal Oil & Gas Co.

NEW GASOLINE PLANT ANNOUNCED FOR K.M.A. FIELD



Sunray Oil Co. and Phillips Petroleum Co. will start immediate construction of a jointly owned natural gasoline plant in the K.M.A. pool area near Wichita Falls, Tex., it was announced by C. H. Wright, president of Sunray. The plant will be capable of handling all of the gas in that vicinity and will be located on Sunray's Mangold lease in the southwest extension of the pool proper.

Both Sunray and Phillips have large acreage holdings to be served by the plant. In addition, contracts have been signed with several independent producers and major companies to process their gas.

Deep Oil Development Co., discoverer of the field, is now operating the only other gasoline plant at K.M.A. The plant, shown in the accompanying photograph, has a daily capacity of 4,000,000 cubic feet. Residue gas is being returned to one well as a means of pressure maintenance. The casinghead gas in this field is very rich, testing 2.19 gallons per 1,000 cubic feet of 26-70 gasoline at 16 pounds separator pressure.

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obtainable without delay from Louisana, Texas, New Mexico, Oklahoma and Kansas stocks.

Every one perfectly bored, correctly balanced, and positively guaranteed against any defects.

GENERAL SPECIFICATIONS

O. D. Dia.	Length	Bore	D. P. Used With	Approx. Wt.
4⅝"	20' 24' 30'	1⅞"	3½"	831 lbs. 1,022 lbs. 1,308 lbs.
6¼"	20' 24' 30' 40'* 50'	2 13/16"	4½"	1,375 lbs. 1,708 lbs. 2,203 lbs. 3,039 lbs. 3,870 lbs.
7"	20' 24' 30' 40'* 50'*	3 13/16"	5 1/16"	1,662 lbs. 2,035 lbs. 2,596 lbs. 3,528 lbs. 5,561 lbs.
8"	20' 24' 30' 40'* 50'	4½"	6⅝"	2,108 lbs. 2,576 lbs. 3,277 lbs. 4,445 lbs. 5,613 lbs.
9"	20' 24' 30' 40'* 50'*	4½"	6⅝"	2,638 lbs. 3,278 lbs. 4,261 lbs. 5,883 lbs. 7,505 lbs.

* Furnished on order from mill.

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SAE 1040 Forged Carbon Steel—Fully normalized.

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GENERAL OFFICE AND WORKS: WICHITA, KANSAS

HOUSTON . DALLAS . SAN ANTONIO . SHREVEPORT . ODESSA . TULSA
OKLAHOMA CITY . WICHITA AND BRANCH STORES

Programs for A.A.P.G. and Society of Exploration Geophysicists Meetings

The twenty-third annual meeting of the American Association of Petroleum Geologists and the ninth annual meeting of the Society of Exploration Geophysicists will be held in the Roosevelt Hotel, New Orleans, La., March 14-18. The final programs of these two associations are given below. From the subjects selected for more than 100 papers to be presented before the technical meetings of these two societies, it is anticipated a large crowd will attend.

Wednesday, March 16

9:00 a.m. R. A. Steinmayer (Tulane University), general convention chairman, presiding.

Address of Welcome, Richard W. Leche, Governor of Louisiana.

Response, R. D. Reed, past president of the association.

Address, "The Function of Geological and Engineering Science in the Conservation Movement," Ernest O. Thompson, Texas Railroad commissioner and chairman of the Interstate Oil Compact.

9:30 a.m.-12:30 p.m. Presiding: H. B. Fuqua, H. V. Howe.

1. H. B. Fuqua (Gulf Production Co., Fort Worth, Tex.): Presidential Address.

2. F. H. Lahee (Sun Oil Co., Dallas, Tex.): Wildcat Drilling in 1937.

3. J. E. Pogue (Chase National Bank, New York): Economic Aspects of Drilling.

4. N. H. Darton (U. S. Geological Survey, retired, Washington, D. C.): Tectonics of the Southwest.

5. G. A. Wilson (Tulane University, School of Law, New Orleans, La.): Role of the Petroleum Geologist in the Development of the Law of Oil and Gas.

6. F. B. Plummer (Bureau of Economic Geology, Austin, Tex.): Oil Reservoirs.

1:30-4:45 p.m. Presiding: C. E. Dobbin, A. I. Levorsen.

7. Warren B. Weeks (Phillips Petroleum Co., El Dorado, Ark.): South Arkansas Stratigraphy with Special Emphasis on the Older Coastal Plain Beds.

8. Lloyd W. Stephenson and John B. Reeside, Jr. (U. S. Geological Survey, Washington, D. C.): Comparison of the Upper Cretaceous Deposits of the Gulf Region and the Western Interior Region.

9. C. C. Clark, A. F. Crider, V. P. Grage, R. T. Hazzard, E. V. Hutson, H. R. Kamb, S. A. Packard, G. D. Thomas, E. F. Warren: Resume of Certain Cretaceous Fields of Louisiana. (See Abstracts 56-64.)

10. B. W. Blanpied and R. T. Hazzard (Gulf Refining Co., Shreveport, La.): Stratigraphic Relations of the Limestone Creek Group, Wayne County, Mississippi.

11. Urban B. Hughes (Laurel Oil & Gas Co., Laurel, Miss.): Detailed Study of the Bucatunna-Vicksburg Contact in Smith County, Mississippi.

12. Chalmer J. Roy (Louisiana State University, Baton Rouge, La.): Type Locality of the Citronelle Formation, Citronelle, Ala.

13. Lloyd W. Stephenson and W. H. Monroe (U. S. Geological Survey, Washington, D. C.): Stratigraphy of the Upper Cretaceous Series in Mississippi and Alabama.

14. C. Wythe Cooke (U. S. Geological Survey, Washington, D. C.), and Arthur C. Munyan (Division of Mines, Mining and Geology of Georgia, Atlanta, Ga.): Stratigraphy of the Coastal Plain of Georgia.

15. M. A. Hanna and Donald Gravell (Gulf Production Co., Houston, Tex.): Tertiary Zones of Correlation Through Mississippi, Alabama and Florida.

Thursday, March 17

9:00 a.m.-12:30 p.m. Joint session with the Society of Exploration Geophysicists. Presiding: Donald C. Barton, J. C. Karcher.

16. J. M. Frost, III (University of Texas, Austin, Tex.): The Geologic Aspect of Heaving Shales on the Texas Coast.

17. John L. Rich (Department of Geology, University of Cincinnati, Cincinnati, Ohio): Graven Faulting and Associated Phenomena.

18. Paul H. Price and A. J. W. Headlee (West Virginia Geological Survey, Morgantown, W. Va.): Regional Variations in the Composition of Natural Gas in the Appalachian Province.

19. T. V. Moore (Humble Oil & Refining Co., Houston, Tex.): Behavior of Fluids in Oil Reservoirs.

20. Frank G. Miller and R. C. Miller (U. S. Bureau of Mines, San Francisco, Calif.): Resume of Problems Relating to Edgewater Encroachment in Oil Sands.

21. John S. Ivy (Union Producing Co., Houston, Tex.): The Rodessa Oil Field.

22. W. Armstrong Price (Geologist, Corpus Christi, Tex.): Comparison of Gulf Coast and Appalachian Geosynclines.

23. Carroll E. Cook (Humble Oil & Refining Co., New Orleans, La.): The Darrow Salt Dome, Ascension Parish, Louisiana.

24. J. C. Karcher (Geophysical Service, Inc., Dallas, Tex.): Review of the Relation Between Physics and Geology.

25. Alexander Deussen (Geologist, Houston, Tex.): Discoveries.

1:30-4:30 p.m. Presiding: G. C. Gester, Harry H. Nowlan.

26. Phillip B. King (U. S. Geological Survey, Washington, D. C.): Paleogeography and Correlation of West Texas Permian.

27. Addison Young, Max David, E. A. Wahlstrom (Landreth Production Co., Fort Worth, Tex.): Geology of the Goldsmith Pool, Texas.

28. C. E. Dobbin (U. S. Geological Survey, Denver, Colo.): Geologic Structure of Part of Petroleum Reserve No. 7 Washington County, Utah.

29. Hal P. Bybee (Bureau of Economic Geology, Austin, Tex.): The Possible Nature of Some Limestone Reservoirs in the South Permian Basin.

30. Robert Roth (Humble Oil & Refining Co., Wichita Falls, Tex.): The Triassic Period in the United States.

31. Robert H. Cuyler (University of Texas, Austin, Tex.): The Travis Peak Formation of Central Texas.

32. Clark Millison (Geologist, Tulsa): Subsurface Study of the North Flank of the Wichita Mountains, Oklahoma.

33. E. J. Bartosh (Bankline Oil Co., Los Angeles, Calif.): The Wilmington Oil Field, California.

34. J. R. Lockett (Ohio Fuel Supply Co., Columbus, Ohio): Structural Significance of the Cincinnati Arch.

35. Kendall E. Born (Tennessee Division of Geology, Nashville, Tenn.): A Lower Ordovician Sand Horizon (St. Peter) in Middle Tennessee.

Friday, March 18

9:00 a.m. Annual business meeting.

10:00 a.m.-12:30 p.m. Presiding: R. D. Reed, Alexander Deussen.

Symposium on Recent and Current Developments

36. A. H. Bell (Illinois State Geological Survey, Urbana, Ill.): Illinois.

37. E. A. Newman (Michigan Department of Conservation, Lansing, Mich.): Michigan.

38. Rycroft G. Moss (Phillips Petroleum Co., Wichita, Kans.): Kansas.

39. Edwin H. Hunt (Texas Co., Denver, Colo.): Rocky Mountain Area.

40. H. P. Bybee and Berte R. Haigh (Bureau of Economic Geology, Austin, Tex.): Summary of Petroleum Development in West Texas and Southwestern New Mexico During 1937.

41. Harold W. Hoots (Richfield Oil Co., Los Angeles, Calif.): California.

42. H. K. Shearer (Hunter Co., Shreveport, La.): Oil and Gas Development in South Arkansas and North Louisiana in 1937.

43. E. A. Wendlandt (Humble Oil & Refining Co., Tyler, Tex.), and C. L. Herold (Shell Petroleum Co., Tyler, Tex.): Resume of Development During 1937 in the East Texas District.

44. O. L. Bracé (Geologist, Houston, Tex.): Texas Gulf Coast Developments in 1937.

45. Stuart Mossom (Magnolia Petroleum Co., San Antonio, Tex.): 1937 Activities in South Texas.

46. Basil B. Zavoico (Chase National Bank, Houston, Tex.): Russian Developments in 1937.

1:30-4:30 p.m. Presiding: W. B. Heroy, Frank Morgan.

47. Frank W. Dewolf (Professor of Geology, University of Illinois, Urbana, Ill.), and W. W. West (Baker, Mont.): Stratigraphic Studies of the Baker-Glendive Anticline, Eastern Montana.

48. W. T. Nightingale (Mountain Fuel Supply Co., Rock Springs, Wyo.): Petroleum and Natural Gas in Non-Marine Sediments of the Powder Wash Field in Northwest Colorado.

49. W. D. Anderson and James R. Day (Amerada Petroleum Co., Midland, Tex.): Monument Field, Lea County, New Mexico.

50. Ralph E. Taylor (Freeport Sulphur Co., New Orleans, La.): A Contribution to Salt-Dome Terminology.

51. H. B. Stenzel (Bureau of Economic Geology, Austin, Tex.): The Yegua Problem.

52. Henry N. Toler (Mississippi Oil and Gas Supervisor, Jackson, Miss.), and Watson H. Munroe (U. S. Geological Survey, Washington, D. C.): The Jackson Gas Field and the State-Deep Test Well.

53. D. J. Munroe (Sun Oil Co., Hattiesburg, Miss.): The Scanlan or Midway Dome in Lamar County, Mississippi.

Papers Ready by Title

54. Merle C. Israelsky (Union Producing Co., Houston, Tex.): Cretaceous and Late Comanche Stratigraphy of the Arkansas-Louisiana-East Texas Area.

55. G. S. Buchanan (Adams Louisiana Corp., Houston, Tex.): Cheneyville Oil Field, Rapides Parish, Louisiana, and its Relation to the Areas of Mother Salt Deposition.

56. C. C. Clark (Union Producing Co., Shreveport, La.): Sugar Creek Gas Field, Louisiana.

57. A. F. Crider (Geologist, Shreveport, La.): Bellevue Dome, Bossier Parish, Louisiana.

58. V. P. Grage and E. F. Warren (Gulf Refining Co., Shreveport, La.): Lisbon Oil Field, Claiborne and Lincoln Parishes, Louisiana.

59. R. T. Hazzard (Gulf Refining Co.), and A. M. Lloyd (Sun Oil Co., Shreveport, La.): Resume of Louisiana Upper Cretaceous Fields.

60. H. R. Kamb (Arkansas Fuel Oil Co., Shreveport, La.): Bear Creek, Driscoll and Simsboro Gas Fields, Bienville and Lincoln Parishes, Louisiana.

61. S. A. Packard (Arkansas Fuel Oil Co., Shreveport, La.): The Sligo Field, Bossier Parish, Louisiana.

62. G. D. Thomas (Shell Petroleum Corp., Shreveport, La.): Carterville-Sarepta and Shongaloo Fields, Bossier and Webster Parishes, Louisiana.

63. E. B. Hutson (Stanolind Oil Co. of Louisiana, Shreveport, La.): The Cotton Valley Field, Webster Parish, Louisiana.

64. C. I. Alexander (Magnolia Petroleum Co., Lake Charles, La.), A. M. Lloyd (Sun Oil Co., Shreveport, La.) and R. T. Hazzard (Gulf Refining Co., Shreveport,

(Continued on Page 114)

INTERNATIONAL NEWS

Mexican Wage Controversy Continues Pending Decision

Statements which the oil companies operating in Mexico claim are designed to influence the decision of the supreme court in the wage controversy with labor syndicates were issued from two directions last week. Meanwhile, oil companies and labor both predicted the decision would be forthcoming within a few days. The court's ruling will be in the form of granting or denying the plea of the oil companies for an injunction setting aside an order of the Mexican Labor Board issued on December 18, 1937, calling on the 16 British and United States concerns to increase wages by from $7,500,000 to $18,000,000 annually. The discrepancy between the two figures represent the increased pay involved in the order according to analysis by the labor board and the companies, respectively. Vincente Lombardo Toledano, head of the Mexican Workers Confederation, made the public assertion last week that it was "nearly certain" the supreme court would deny the companies' petition for an injunction. The declaration was made by Toledano at the opening session of the confederation's annual meeting at Mexico City.

The labor leader's assertion drew a reply from the companies in a joint statement which said:

"We note with pain that Senor Lombardo Toledano, representing but one section of Mexican opinion, declared that the supreme court, supposedly acting as arbiter among all sections, will rule on the petroleum wage controversy 'in such a way that the companies will be replaced by the government and workers.'

"In expectation of a fair and impartial decision, the companies presented themselves to the supreme court, posted bond and in all ways acted legally. We do not believe that Senor Toledano is the sole arbiter of the nation or the qualified spokesman for the highest tribunal of the land. If, however, he presumes to dictate the decision of the supreme court, we believe the conscience of the nation will rebel against such an attempt to pervert the course of justice. We went to the supreme court asking one thing only: Justice, based strictly on the law and fact. We hope events will not show that this professional labor leader has power and influence over the court's decision."

Toledano, referring to the petroleum dispute, said: "We are on the eve of a critical situation. The companies are engaged in all sorts of maneuvers, including the exportation of their monetary reserves, thereby frightening the bankers and causing the bourgeois to do likewise."

His speech was chiefly a repetition of his earlier harangues to the workers regarding the dangers of fascism in Mexico. The labor leader attacked the late American ambassador, Dwight Morrow, for allegedly persuading former President Plutarco Elias Calles to "order" the Mexican supreme court to rule that the petroleum nationalization law was not retroactive.

In a later address before the confederation of workers, President Lazaro Cardenas took the foreign oil companies to task for alleged antilabor activities. His remarks, however, were considered somewhat conservative in that he pledged enforcement of the supreme court's ruling in the oil case which might be embraced by either side with equal enthusiasm.

Peru's Production Continues Downward Trend in January

Crude oil production from Peru continued its downward trend in January compared to December and to January, 1937. Colombia's output for the same month was about 74,000 bbls. under production in December, 1937, but was about 80,000 bbls. higher than for the first month of last year.

International Petroleum Co., Ltd., produced 1,119,764 bbls. of oil in Peru in January. Including the combined output of Lobitos Oilfields, Ltd., and that of F. G. Piaggio at Zarritos, Peru's January production is estimated at 1,332,764 bbls., compared to actual output of 1,469,460 bbls. in the same month of 1937. International's production in December, 1937, totaled 1,232,212 bbls.

Colombia's production in January is reported by Tropical Oil Co., a subsidiary of International, at 1,748,572 bbls., compared to 1,824,956 bbls. for December, 1937, and with 1,668,470 bbls. for January, 1937.

Unaccounted-For Supply of Oil Attributed to War Stores

In a paper on world consumption of petroleum products and related fuels presented before the A.I.M.E. annual meeting in New York by V. R. Garfias, R. V. Whetzel and J. W. Ristori, all of Cities Service Co., an interesting question was raised about possible military storage of oil abroad.

Preliminary estimates, the authors say, indicate world consumption of petroleum products and related fuels in 1937 shattered previous records with a figure of 1,920,000,000 bbls. or 124,000,000 bbls. over the 1936 total. The writers, however, have been unable to account for all the available supply in 1937. This "unaccounted-for" supply, formerly thought to go largely into storage in foreign countries, was close to 53,000,000 bbls. in 1933, 93,000,000 in 1934, 111,000,000 in 1935, 75,000,000 in 1936 and 148,000,000 bbls. in 1937. As this discrepancy between supply and demand continued year after year it became evident other reasons than additional foreign stocks were responsible.

It can now be stated, the authors say, that the "unaccounted-for" supply goes to take care of (1) consumption of petroleum products and related fuels for military purposes the figures of which have been and are kept confidential by foreign countries, (2) additions to stocks to be consumed for military and non-military purposes in foreign countries on which likewise no information is available, (3) errors incurred in the conversion of figures of production of crude oil, its products and related fuels from "weight" units, as used in Russia for instance, to their American or "volume" equivalents and vice versa, and (4) to the lack of reliable statistics on production and consumption particularly from Russia, the second largest producer and consumer.

The writers also presented the accompanying tabulation of world consumption last year.

Petroleum Exports From U.S.S.R. Declined Considerably in 1937

Petroleum exports from the U.S.S.R. declined to 1,552,726 metric tons during 1937, according to calculations based on shipments passing Istanbul and originating in the Black Sea, which covers practically all of the country's outbound shipments.

During December alone, petroleum exports totaled 134,802 tons consisting of 4,520 tons of lubricating oil; 57,374 tons of fuel oil; 5,742 tons of kerosene and 67,166 tons of gasoline. In December, 1936, petroleum exports from Russia aggregated 208,393 tons and for the entire year totaled 2,516,850 tons.

As apparent from the statistics available, the Soviet petroleum industry is constantly dwindling as a factor in world markets, which is one of the contributory reasons for the rise in shipments from the United States and Venezuela.

WORLD CONSUMPTION OF PETROLEUM PRODUCTS AND RELATED FUELS—1937

(Thousands of barrels)

	Motor fuel	Kerosene	Gas and fuel oil	Lubricants	Miscellaneous	Total
United States	517,000	55,000	442,000	23,900	130,000	1,167,900
Russia	24,000	41,000	64,000	9,200	20,000	158,200
United Kingdom	43,000	6,600	27,400	3,700	4,300	85,000
France	25,000	1,700	17,200	2,300	4,700	50,900
Canada	21,000	600	14,000	3,600	4,300	43,500
Germany	20,000	2,250	17,000	1,300	2,450	43,000
Japan	10,400	2,000	16,500	2,500	2,700	34,100
Argentina	6,300	1,200	16,000	300	1,500	25,300
Mexico	3,600	1,000	15,000	300	1,690	21,590
Italy	5,200	900	11,300	900	1,700	20,000
Netherlands West Indies	180	30	13,500	40	4,300	18,050
British India	2,650	6,950	4,100	1,050	1,400	16,150
Australia	7,500	1,300	3,600	450	1,000	13,850
Rumania	700	1,000	9,000	200	1,500	12,400
Netherlands East Indies	1,500	1,950	6,100	250	1,500	11,300
The Netherlands	3,500	2,000	3,500	400	1,000	10,400
Iran	540	1,080	4,900	320	2,100	8,940
Sweden	4,000	900	2,900	400	700	8,900
Venezuela	650	30	1,300	40	6,300	8,320
Brazil	2,700	850	4,200	250	100	8,100
Belgium	4,600	370	1,300	430	530	7,230
China	1,000	2,500	2,900	280	360	7,040
Union of South Africa	3,800	430	1,790	260	320	6,600
Denmark	2,700	700	2,100	350	200	6,050
Egypt	750	1,820	2,460	150	430	5,610
Spain	2,900	200	1,700	100	200	5,100
Norway	1,600	500	2,500	150	200	4,950
New Zealand	3,000	210	1,280	110	210	4,810
Cuba	520	70	4,000	40	120	4,750
Trinidad	120	70	4,100	30	310	4,530
Philippine Islands	1,080	620	2,570	90	140	4,500
British Malay	1,000	330	2,800	120	200	4,450
Iraq	370	230	2,300	60	800	3,760
Chile	610	60	2,730	70	40	3,510
Hawaiian Islands	1,050	150	2,130	70	70	3,470
Switzerland	1,700	200	1,300	150	100	3,450
Czechoslovakia	1,820	630	560	270	50	3,330
Austria	970	300	1,280	160	160	2,870
Poland	600	1,000	450	300	450	2,800
Peru	590	210	1,600	30	320	2,750
Uruguay	670	60	1,920	40	40	2,730
Panama Canal Zone	120	30	2,460	20	40	2,670
Greece	600	170	1,400	60	70	2,300
Irish Free State	1,200	520	270	70	200	2,260
Algeria	1,050	380	400	70	170	2,070
Hungary	590	480	640	110	110	1,930
Puerto Rico	520	70	1,060	30	40	1,720
Finland	800	590	110	110	110	1,720
Portugal	610	420	290	60	70	1,450
French Morocco	820	100	110	40	140	1,210
Others	7,200	6,000	24,800	1,120	2,900	42,020
Total	744,380	147,760	768,810	56,350	202,240	1,919,540

Consumption figures include crude consumed as such, all its products and related fuels such as benzol, natural gasoline, alcohol used as motor fuel. Oil delivered to ships' bunkers is included in consumption of country where deliveries are made.

ENGINEERING and OPERATING

In This Issue

GAS-LIFT — MODERN METHOD FOR THE PRODUCTION OF CRUDE OIL
By S. F. Shaw ..... *Page 42*

Gas-lifting is steadily becoming a more important method of oil production, and as additional experience is gained factors tending to limit its use are being eliminated. A discussion of these factors is given and also influence of depth of wells, pressure and permeability.

OPERATORS MORE WILLING TO CHANGE OIL PRODUCTION METHODS
By L. T. Gibbs ..... *Page 50*

Although radical changes in oil production methods take place very slowly, minor changes acting to produce oil more economically are constantly arising. Here the writer outlines some important steps that have taken place with emphasis placed on the economics involved.

DEVELOPMENTS IN SHALLOW-WELL PUMPING AID PRODUCERS *Page 54*

Extensive research and experimentation conducted by operators in South Arkansas fields have greatly increased the life and efficiency of metal-to-metal seal working barrels. Equipment and practices followed in that area are described and new developments discussed.

EFFECT OF HYDROCARBONS ON CARBON MONOXIDE DETERMINATIONS
By K. A. Kobe and N. R. Dunbar ..... *Page 59*

The effect of paraffin hydrocarbons on the accuracy of carbon monoxide determinations, in which the percentage of carbon monoxide was less than .1, was recently investigated by the authors. Here the results of their work are discussed, and a description of method given.

STUDY OF PRODUCING HORIZONS AIDED BY GRAPHIC WELL RECORDS
By H. L. Kirkpatrick ..... *Page 60*

Extensive developments in deep-well drilling have caused more attention to be paid to recording information obtained by drilling. Much improvement has been made in compiling well records, the more detailed and specific records offering great aid in correlating wells.

DETERMINING PRODUCTIVITY BY BOTTOM-HOLE PRESSURE AND CORES
By W. S. Walls ..... *Page 64*

Productivity data, determined from subsurface pressures and production data, have proven very useful for determining operating conditions. Common sources of error in productivity measurements and factors affecting the validity of the measurements are discussed.

PROGRESS IN METALS—*By W. L. Nelson* ..... *Page 46*

OPERATING IDEAS ..... *Page 49*

QUESTIONS ON TECHNOLOGY—*By C. K. Francis, Ph. D.* ..... *Page 79*

PROBLEMS FROM READERS—*By L. G. E. Bignell* ..... *Page 81*

GAS-LIFT —

By S. F. SHAW
Consulting Engineer, San Antonio, Tex.

GAS-LIFTING has become a recognized and important oil production method. It has its limitations just as is the case with any other production method. However, these limitations are gradually becoming narrowed as the method becomes better known and as greater experience is obtained in the use of it.

A discussion of the use of gas-lift might be approached by classifying the problems under the heads of depth, pressure, permeability of the sand, and character of the fluid to be lifted. Gas-lift operations are influenced by the depth of the wells, which might be classified as follows:

1. Depths ranging from a few feet to 2,000 feet.
2. Depths ranging from 2,000 feet to 4,000 feet.
3. Depths ranging from 4,000 feet to 6,000 feet.
4. Depths ranging from 6,000 feet to 8,000 feet.
5. Depths ranging from 8,000 feet to 10,000 feet.

Classes of Work

The operations under each of these depth classifications would then be influenced by the flowing pressure, whether high or low; by the permeability of the sand, whether high or low; by the character and density of the fluid, whether it be clean pipe line oil or whether accompanied by a large quantity of water.

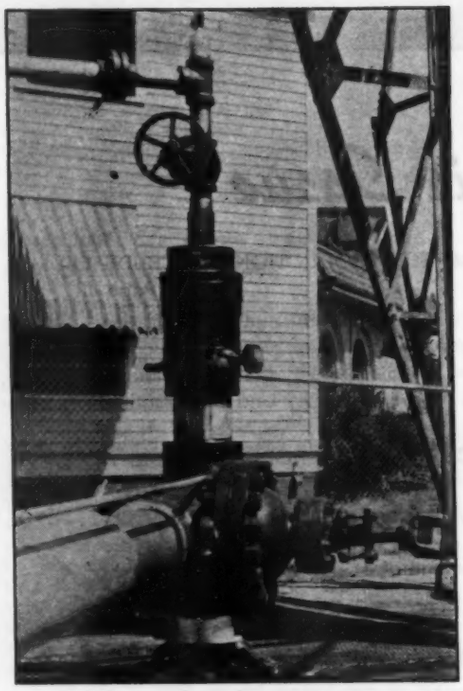
Water wells for municipal purposes, ranging in depths up to 2,000 feet have been produced by air-lift for many years. In these wells the flowing pressure relative to the lift, is fairly high, as a rule, ranging from 100 to 500 pounds pressure. These water sands are usually quite permeable, sometimes consisting of loose gravel, and the amount of water per day so lifted in many cases is a large quantity.

This method has been employed for dewatering mines in various places. The writer had occasion to unwater a large mine in Mexico in which the quantity of water lifted reached as high as 35,000 bbls. per day.

Oil Operations

Oil wells within the range of depths from 0 to 2,000 feet have been lifted economically by air- or gas-lift. Bellevue, Louisiana is a shallow field with large production which lent itself to the use of air-lift. Wells in Colombia and Peru within these depth ranges have been produced to advantage on gas-lift, also some wells in Argentine have been so produced both by straight gas-lift and by intermittent flow.

Shallow wells can be more economically lifted by gas-lift than can deep wells, in as much as the quantity of gas required per barrel of oil lifted is a very small amount. However, the question of plant depreciation must be carefully considered, and one would do well to install a plant for handling oil at shallow depths, only if he has the assurance that he will have several wells to produce for a considerable length of time. As a rule shallow wells are small wells, and the pay-out must come as a result of long life operation.



A well on continuous gas-lift in the Oklahoma City field

A considerable number of fields have been produced by gas-lift with depths ranging from 2,000 to 4,000 feet. Burbank, Currie, East Texas, Powell, Smackover, Wortham, and various fields in Argentine, Colombia, Peru, Rumania, Russia, and Venezuela fall within this classification. Some of these fields have been studied at first hand by the writer. Currie, Powell and Wortham were brought in at a time when engineering principles were not understandingly applied to the air-lift in connection with the lifting of oil, nor had compressors been built that were economical when used on gas. As a rule steam was then employed as the motive power, which resulted in a huge consumption of crude oil, even though gas was available as a fuel, but the application of gas for fuel for lifting was not then carefully worked out.

Burbank Field

Gas-lift was applied in the early part of the Burbank field at depth of about 2,800 feet, and was quite successful so far as lifting the oil was concerned, but when the wells declined to 50 or 100 bbls. per day, they were placed on the beam pump as being more economical to operate. Handling of plant operation at that time had not been worked out economically, and intermittent flow had not yet been applied in a successful manner. A few years later, a few wells in this field were placed on intermittent flow, and were successful in competing with central powers, in that they could be operated from a central gasoline plant, and were also able to produce more oil than when operated on the pumping jack.

The oil in the Cromwell field is found at a depth of about 3,400 feet. Intermittent operations were employed in this field, but a bad emulsion difficulty was encountered at this period which was earlier than the time when the present-day flow treaters were designed, and this operation was discontinued. Approximately 4,200 cubic feet per barrel were required when employing intermittent flow, and producing at the rate of 22 bbls. per day. Not much information of a definite nature has been published regarding gas-lift operations in the East Texas field, and yet there are probably more wells in that field produced by gas-lift than in the history of any other field. However, gas-lift methods in East Texas are not conducted with a view of establishing large po-

The largest gas-lift plant in the world. Oklahoma City field

Hook-up of a well on gas-lift in the Corpus Christi field

Well produced for a while on gas-lift and on natural flow in the Turner Valley field, Canada

Modern Method for Production of Oil

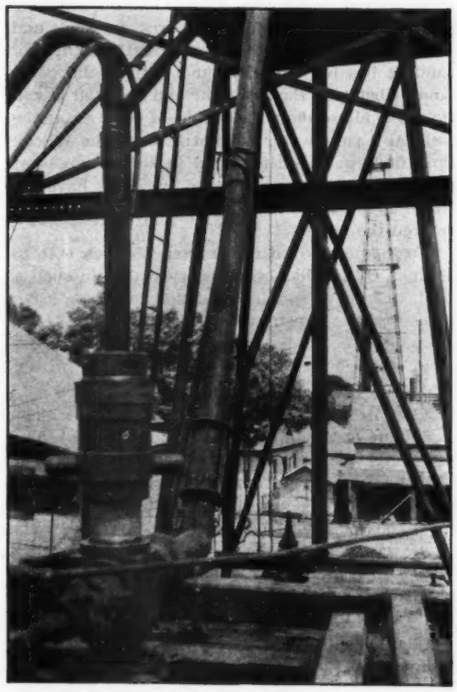
tentials, or for lifting large daily quantities of oil, consequently little publicity has attended the use of gas-lift methods in this field. The gas is admitted for a short time and allowed to function for only the time that is required to lift the allowable, which averages about 20 bbls. per day. In many wells, the conditions are such that 20 bbls. can be produced within a few minutes.

Greater efficiency and lower costs could be obtained if the well was produced for a longer period, but the rules of the railroad commission as to producing each day's allowable within the 24 hour period acts as a deterrent to handling operations in that manner.

Reservior pressures in the East Texas field are still high from a gas-lift point of view, and only a small quantity of gas is sufficient to lift a barrel of oil. As long as the reservoir pressure in the field remains above 750 pounds, the actual quantity of gas dissolved in the oil is about 350 feet per barrel. This quantity is sufficient to lift a barrel of oil until the pressure declines to 400 pounds flowing pressure, provided operating conditions do not interfere with the efficient use of the gas. It has been shown that a compressor plant, consisting of a 100 hp. unit, can handle the production from a lease containing 10 to 20 wells, and the cost of the installation need not average more than $500 to $600 per well, where a large group of wells is being handled.

The Humble Oil & Refining Co. has an extensive gas-lift system in the East Texas field, employing residue gas from a central gasoline plant, the operation being conducted in such a manner that a high efficiency is obtained from an operating standpoint.

Gas-lift has been employed in various fields of Rumania with success, those in Moreni



Combination gas-lift Reda pump well in the Oklahoma City field

with an output gas ratio of 2,000 feet per barrel.

Gas-lift production in Peru has been carried on with a considerable degree of success, and many wells have been handled. As an example, one well producing 32½-degree gravity oil through a 3-inch tubing string required by an output gas factor of 1,100 feet per barrel.

Many fields at depths of 4,000 to 6,000 feet have been produced on gas-lift. These depths enter an area where difficulties in sucker-rod pumping increase considerably, thus affording a greater opportunity for the use of the gas-lift, and in many cases the quantities to be handled immediately after natural flow ceases, are beyond the capacity of any other known method. Fields within this classification include Corpus Christi, Huntington Beach, Long Beach, Marshall, Lucien, Santa Fe Springs, Seminole, Tonkawa, Wewoka, also fields in Colombia, Peru, and Rumania.

The most noteworthy area of this class is Seminole, where enormous quantities of oil were lifted by this method. Wells producing a few hundred barrels per day by other methods were made to produce as many thousands of barrels per day on gas-lift. Since this was at a time when there was a large demand for oil at a fairly high price, there was a mad race to complete wells as rapidly as possible and to install gas-lift plants quickly, almost regardless of cost both for machinery and for operation of the plants.

Seminole Area

The chief producing formation at Seminole is the Wilcox sand which is very porous and fairly thick, and in the early life of the field there was very little water with the oil, and also very little gas to serve as a lifting medium for natural flow. The depth is 4,000 to 4,500 feet. Under these conditions, the wells were capable of making up to 8,000 bbls. per day on gas-lift through 7-inch O.D. casing, with the expenditure of only a few hundred feet of gas per barrel of oil. At that time, gas engine-driven compressors were just coming into use for gas-lift operations, but their installation and operation was not as well systematized as at the present time. Consequently the cost of compressing the gas was much higher than now. The cost of compressing gas at that time ranged from perhaps 4 cents to 10 cents per thousand feet, and even with this high cost, the operation of wells in the early days when only a few hundred feet per barrel was required, was one of low cost. However, as the flowing pressure declined, the consumption of gas increased to a point where the operating cost was higher than was thought wise to accept in view of the high cost of compression. Under the same reservoir conditions that existed in the Seminole field in the early days, plants would now be built to compress gas at 1 cent to 2 cents per thousand feet.

Intermittent flow was developed for producing wells at Seminole, and in some of the California fields, when the production declined to a small amount. It was found by this method that more oil could be produced in small wells than on continuous gas-lift. Also the consumption of gas per barrel of oil was a much lower quantity. In the Seminole field, the favorite type of installation

Gas-lift plant in the Oklahoma City field

Gas-lift plant in the Corpus Christi field

and Ceptura having probably been the most extensive operations.

Several wells in Colombia have been produced on gas-lift. The oil in this country that is being produced is about 22½ degrees, and in one case lifting through a 3-inch tubing was performed

Kobe hydraulic pump in the Oklahoma City field

was one in which a tubing of 1½-inch or 2-inch was run inside a tubing of 3-inch, at the lower end of which was attached a chamber, and the oil was lifted through the inner string of tubing. The consumption of gas was about 5,000 feet per barrel. At the current cost of producing gas at 5 cents or higher per thousand feet, this lifting expense was about 25 cents per barrel. With gas costing 1 cent or thereabouts, as at the present time, the cost becomes 5 cents, which is a low figure.

In the course of time, water invaded the Seminole field, and with low flowing pressures, high cost of gas compression, and large consumption of gas, the wells were gradually placed on the beam pump.

However, in certain areas of the Seminole field, the wells were invaded by large quantities of water under considerable pressure, under which condition the consumption of gas per barrel of fluid was not high. The use of gas-lift in some of these areas was prolonged for a rather long period of time, partly because of the difficulty of finding other methods that would lift the oil and water in sufficient volume to make the operation yield a profit.

Corpus Christi Field

Another field at depth of about 4,000 feet is the Corpus Christi field, where the producing formation is thin, that is, 5 to 10 feet in thickness. The sand is less permeable than that at Seminole, and the diameter of the casing is smaller. Water invaded the producing horizon at an early date, and the flowing pressure continues comparatively high. The allowable for several months has been restricted to 35 to 65 bbls. of oil per day depending on the well-spacing, but to produce this amount of oil, the quantity of water to be lifted of late has ranged from 500 to 2,000 bbls. per day. In other words some wells are producing fluid of which only 3 per cent is oil.

In the Corpus Christi field there have been several gas wells drilled, the gas from these wells being used to gas-lift the fluid. The casing sizes range from 5½-inch O.D. to 7-inch O.D. The smaller sizes of casing are not sufficiently large to lift the quantity of fluid that will come into the well, consequently they are seriously handicapped when it is desired to lift 2,000 bbls. per day. However, the cost of lifting is not excessive when considering the quantity of water being lifted, owing to this available supply of inexpensive gas under pressure. Also, the disposal of water has not been a difficult problem, owing to the proximity of the wells to the bay, into which most of the water is being pumped.

Some of the wells are yet producing on natural flow, but it is probable that most of the wells in the Corpus Christi field are now produced by gas-lift. Some wells are produced by gas obtained from wells in the immediate vicinity, while in other cases, gas is supplied from gas lines which have been extended into the field from gas wells at a distance of 5 to 10 miles.

One compressor plant has been installed in the Corpus Christi field, and is taking gas at an intake pressure of 200 pounds and boosting this to 450 pounds which is the pressure required for handling the wells on this lease at the present time. The cost of plant operation is one-half cent to 1 cent per thousand feet, and the quantity of gas required to lift a barrel of fluid is from 600 to 1,000 feet. With an oil content as low as 3 per cent, the consumption of gas at 800 feet per barrel of fluid is about 27,000 feet per barrel of oil, and the lifting cost for gas at three-quarter cent per thousand feet is about 20 cents per barrel of oil.

In this instance of gas-lifting at Corpus Christi with very adverse conditions as to water content, thinness of sand section, and low permeability, but with favorable conditions as to flowing pressure, low cost of gas with which to flow the wells, and low cost of water disposal, operations can be so conducted as to show a fair profit.

In the class of wells having depths of 6,000 to 8,000 feet, probably Oklahoma City is the most notable example. However, some California fields, such as Dominguez, Kettleman Hills, Long Beach, Santa Fe Springs, Seal Beach, Segundo and Ventura Avenue are gas-lifting oil at these depths.

In the Oklahoma City field, the producing horizon is reached at about 6,500 feet. The Wilcox sand is very permeable, with thickness reaching up to 200 feet. Flowing pressures are low, and yet with high permeability and great thickness of sand, it has been noted that a differential of 10 pounds between the reservoir and the well is sufficient to allow about 2,000 bbls. of oil to enter the well. As a rule, water has not invaded the Wilcox sand in large quantities, and in several areas of this field, when the reservoir pressures have declined as low as 25 to 50 pounds, no water has yet entered the wells.

Casings employed range from 6⅝-inch O.D. to 9⅝-inch O.D. It has been observed that in such a field, casings of small size should never be used. The best size so far used here is 9⅝-inch and if the campaign were to be again undertaken under the same conditions, it would be worth while to try out casings of 10¾-inch O.D.

The initial pressure in the Oklahoma City field was about 2,600 pounds and the gas-oil ratio in the early days on natural flow was about 1,000 feet per barrel. At present, the formation gas-oil ratio in wells structurally high, ranges from perhaps 1,000 to 10,000 feet per barrel, while wells down the slope of the reservoir are producing with formation gas-oil ratios of 200 to 500 feet per barrel, provided the wells be produced at a high capacity.

With flowing pressures of 400 pounds, when producing on gas-lift at 6,500 feet depth, the capacity of a casing of 6⅝-inch is about 2,000 bbls. per day, while the capacity of a well completed with 9⅝-inch casing and which has a flowing pressure of 400 pounds is about 12,000 bbls. per day. The quantity of gas required to lift a barrel of oil through the 6⅝-inch casing at the rate of 2,000 bbls. per day is about 3,000 feet, while the quantity of gas necessary to lift through the 9⅝-inch casing at the rate of 12,000 bbls. per day is about 950 feet per barrel. Thus, the advantage of the use of the large casing is obvious both from a capacity point of view, also because of the lower operating cost.

In the Oklahoma City field, the use of combination gas-lift methods has been demonstrated as having great possibilities. After the straight gas-lift wells had declined to a production of 1,000 bbls. per day, the introduction of the combination gas-lift Reda pump method resulted in a production of 4,500 bbls. per day. Under this condition of producing 1,000 bbls. per day on straight gas-lift, the quantity of gas required was about 4,800 feet per barrel, whereas with the combination method, the consumption of gas was about 1,000 feet per barrel.

The Kobe hydraulic pump has also been employed in combination with the gas-lift, and in a well that had declined to perhaps 300 bbls. per day on straight gas-lift, the production was increased to 1,000 to 2,000 bbls. per day. These large increase when using combination methods in the Oklahoma City field with its very thick and permeable sand, could not be expected in a field where the sand is thin and much less permeable.

At one time, after pressures had declined in the Oklahoma City field to about 100 pounds, it was found that when producing through small casings of 6⅝-inch and 7-inch that it was preferable to use intermittent flow, in that larger production could be obtained and lower quantities of gas were consumed than when employing straight gas-lift. In this case, the prevalent method was that of using a packer, and flowing the oil above the packer through the casing, thus avoiding very high pressures for lifting long slugs of oil. If the attempt was made to lift long slugs through a small tubing, the pressures required would be very high. The alternative would be to use short slugs lifted at frequent intervals, if this were possible. This, however, is less practicable in a 6,500-foot well than in a 4,000-foot well, owing to the time required to inject the gas into the well, and have it reach the bottom of the well, and then for the oil to be lifted to the surface. In other words, the number of flows per hour would be restricted, owing to the distance necessary for the gas and the oil to travel in completing the cycle.

When large casings are employed in the Oklahoma City field, intermittent flow is less successful in that there is a tendency for the gas to break through the oil, thus failing to lift the complete slug. Moreover, with the use of large casings, there is less necessity for abandoning continuous gas-lift when pressures decline to a low point.

The use of the plunger-lift, which is a form of intermittent flow, has been quite successful in the Keokuk Falls field, where the sand is tight, and reservoir pressures are high.

Depths of 8,000 to 10,000 Feet

The number of wells reaching depths of 8,000 to 10,000 feet is gradually increasing. Such wells usually come in with high flowing pressures, and there is associated with the oil considerable quantities of gas. Wells that are more than 8,000 feet in depth in the Kettlemen Hills field are now being produced on gas-lift, and since a fairly high flowing pressure still exists and is combined with rather high gas-oil ratios, the quantity of input gas need not be high. Another field within this range of depth is Ventura Ave. where wells are being lifted by gas-lift.

In the course of time, the flowing pressure and the quantity of formation gas will decline, until large quantities of input gas are required to lift the oil. When that time is at hand, will the operators find that they have foreseen this condition, and be able to lift the oil economically and in sufficient volume to make the operation profitable? The sizes of casing employed will have a large bearing on this matter, also the question of compression costs will be most important.

Various fields in the United States, Canada, and Rumania have producing wells at depths between 5,000 and 10,000 feet. There need be no doubt as to the practicability of gas-lifting oil at these depths, or at any depth whatsoever, so long as the wells will flow naturally, since natural flow is strictly gas-lift in which all of the gas that performs the lifting operation is supplied from the formation. There will be the necessity, of course, of laying out operations in these deep wells, so that the principles underlying gas-lift can be complied with.

Wells in the Turner Valley field of Canada are reaching depths of 7,500 feet and so far have all flowed naturally. In the course of time these wells must be produced artificially, and a careful observance of the conditions necessary to employ gas-lift efficiently in the early stages of well completion will have much to do with the later successful production of these wells.

On the Gulf Coast, wells are being completed at great depths, and so far as is known, there is no method that will artificially lift the oil from these depths except gas-lift, when natural flow ceases. Yet casings are being employed for completing some of these wells that will never permit efficient gas-lift operations, nor will efficient natural flow be possible after the first flush is over.

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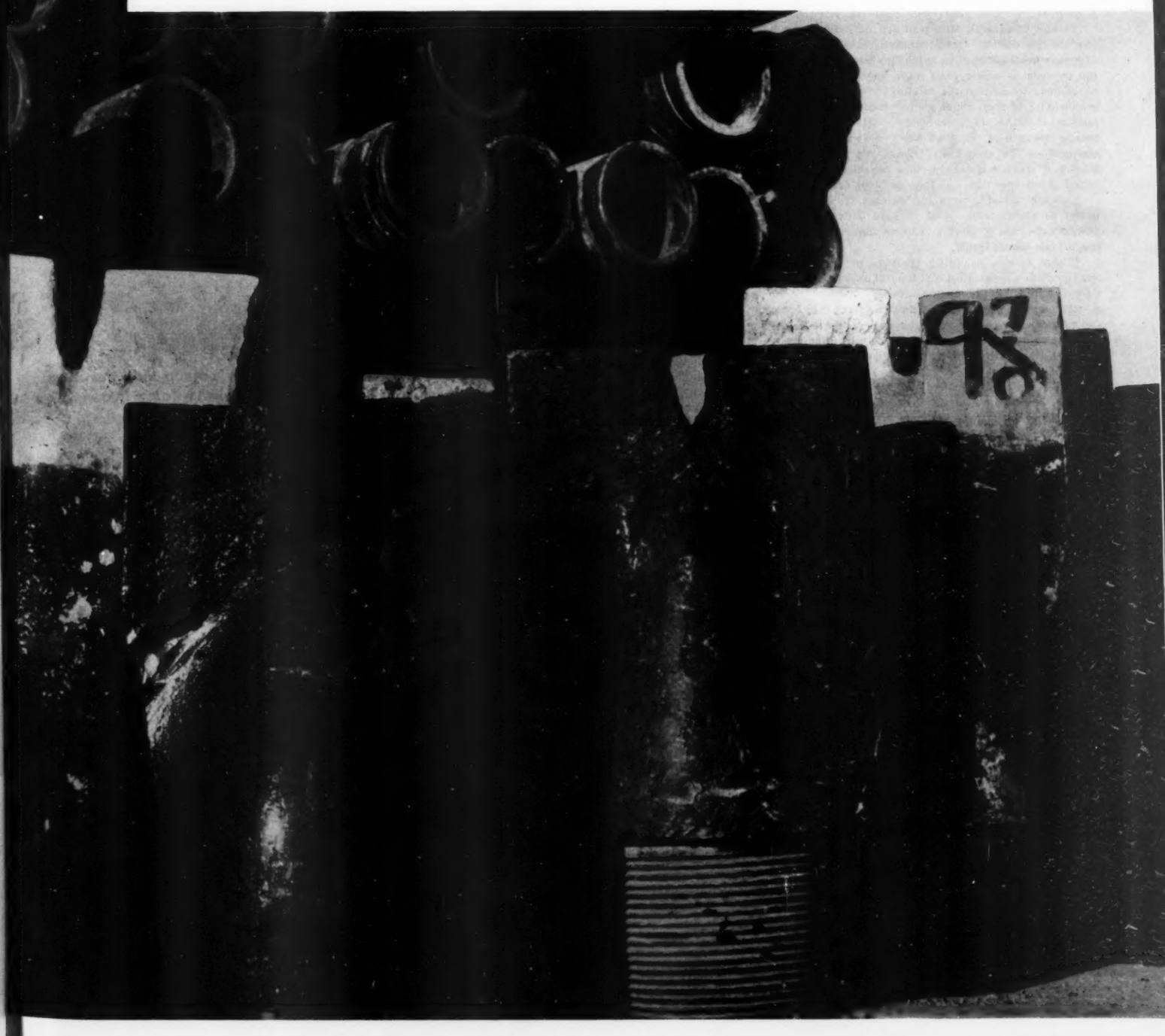


Progress in METALS

By W. L. NELSON

Progress in Cast Iron

An excellent review entitled "Progress in Improvement of Cast Iron and Use of Alloys in Iron" by Paul D. Merica is published in the Trans. Am. Inst. of Mining and Metallurgical Engineers, Vol. 125 (1937).

Service tests with cast iron are definitely proving that the conventional tensile strength and ductility properties are misleading when applied to cast iron—and that the material is better than these tests indicate. Engineers have found that the fatigue strength of cast iron crankshafts is only about 25 per cent lower than the fatigue strength of steel crankshafts although the tensile strength of the steel was two to four times the strength of the cast iron. Other fatigue tests using alloy-iron crankshafts show that the alloy-iron shafts lasted about five times as long as steel crankshafts.

Another valuable property of cast iron is its capacity to absorb vibrational energy. This capacity is higher than that of steel and much higher if the steel has a high elastic limit.

"These recent, scientific findings of investigators only confirm the practical fact long known to users of it that cast iron will stand much abuse.

"And so when we consider the low cost of iron; when we consider those characteristics of iron for which it has always enjoyed respect—the ease and economy of its fabrication into complex shapes and forms and its excellent frictional properties and resistance to wear; and when we finally appreciate, as I have attempted to show, how the useful range of its properties has in recent years been extended and how iron has been more flexibly adapted to a wide variety of industrial service, I think we may agree that the renaissance of cast iron which we have witnessed in the last 15 years is likely to continue and to gain momentum as the years pass by."

The use of alloy cast irons is increasing greatly. In 1936, between 10 and 15 per cent of all gray-iron castings were of the alloy-iron type. Of the 3,500 foundries in the United States almost one-third are marketing alloy-iron castings. It has been estimated that 90 per cent of all automotive engine castings are of alloy iron.

Tables 1 and 2 in the original paper are of particular interest—they show respectively, a summary of the structural effects of alloys on iron, and illustrative examples of compositions of alloy iron in use at present.

Corrosion Test Methods

The American Society for Testing Materials has recently published its "Symposium on Corrosion Testing Procedures." This volume of 131 pages includes seven technical papers by 12 authorities and in addition extensive discussion of each paper, presented at the 1937 regional and annual meetings of A.S.T.M. Almost one-fourth of the book is devoted to discussion, thus making available the opinions of leading technologists and engineers.

The first paper covers principles of corrosion testing and includes a table which offers a bird's-eye picture of the entire subject of corrosion testing. Atmospheric and salt-spray testing are described in detail. An electrical resistance method of determining corrosion rates is described. There are papers on corrosion testing methods for copper alloys, standardizing liquid corrosion tests and finally a very extensive discussion of soil corrosion testing.

Each of the contributions was reviewed by a special committee and the symposium includes authoritative data which should be of considerable interest to all concerned with metallic materials.

Copies of this publication can be obtained from A.S.T.M. headquarters, 260 S. Broad Street, Philadelphia, at $1.25 per copy in heavy paper cover; $1.50 in cloth.

Alloy for Slush Pump Liners and Wear Resistance

A new iron-carbon alloy containing small precentages of nickel combined with boron as a hardening agent is proving to be highly successful for such petroleum services as slush-pump liners, concrete-pump liners, oil-well pumps and other items of oil field equipment such as pump pistons, plungers and wash lines. The alloy is sold under several trade names, such as Xaloy, I.R. Metal and Di-Hard, and a complete discussion of the alloy may be found in the recent bulletin entitled, "It Wears Like Xaloy," which is distributed by Wilcox-Rich, Detroit, Mich. The Oil Well Supply Co. is the exclusive manufacturer of equipment for oil field service except in California, which state is served by the Alford Sales & Service, Ltd.

Nature and Composition.—The alloy consists principally of iron and carbon but the essential addition is a combination of nickel and boron. The resulting

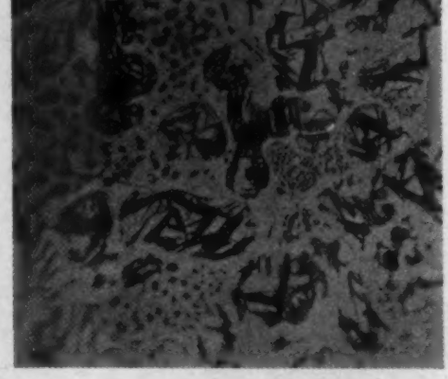


Fig. 1—Photomicrograph of Xaloy showing primarily the hard constituents martensite, and cementite, and no free graphite

alloy is extremely hard and resistant to abrasive wear but the hardness is so great that the material is not suitable for drilling bits, steam shovel teeth or road graders because of a lack of shock resistance. The most useful application is for the lining or overlaying of steel tubes, piston, etc. The metal cannot be machined, grinding being the necessary method of finishing. A photomicrograph of Xaloy is shown in Figure 1. The microconstituents are primarily cementite and martensite and both of these constituents contribute to the hardness. No free graphite is evident in spite of the fact that the alloy contains a considerable percentage of carbon. The alloy is applied to the main body of material by a patented centrifugal casting process which results in a surface covering or skin that ranges in thickness from 1/64-inch to ¼-inch but which is entirely uniform in thickness and hence does not require extensive or expensive grinding to attain finishing tolerances.

The excellency of the bond that is attained between the main body of steel and the Xaloy skin, is indicated in Figure 2. The upper part of this figure shows the Xaloy skin and the dark band in the center shows the diffusion of carbon from the Xaloy into the main body of steel. No heat treatment of any sort is necessary in order to realize the properties of the material. The alloy is more resistant to corrosion than white cast iron or steel but it cannot be classed as a stainless variety of alloy.

Commercial Applications. — Di-Hard slush-pump

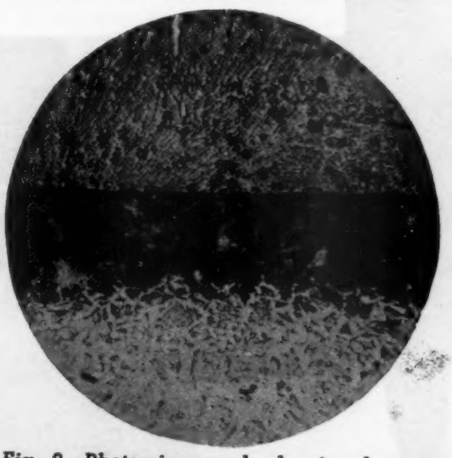


Fig. 2—Photomicrograph showing homogeneous bonding of Xaloy (top) to steel (bottom). The dark center portion indicates migration of carbon from the Xaloy into steel

liners as manufactured by Oil Well Supply Co. have met with noteworthy success. The liners last from 5 to 10 times longer than the best grades of heat treated or carburized liners. A summary of actual service records is given in Table 1.

TABLE 1—SERVICE RECORDS OF SLUSH-PUMP LINERS

Field—	Days of service— Di-Hard	Steel	Ratio of life
Kettleman Hills	131	30	4.4 times
Rodessa, La.			8 times
Ada, Okla.	240	40	6 times
Kansas			5 times

The performance of "I.R. Metal" oil well pumps of the Alford Sales & Service, Ltd., is likewise outstanding. In the case of oil well pumps, a lack of wear resistance is doubly important because if the pump and plunger become worn the efficiency of fluid delivery is greatly reduced. Some of the service records on oil well pumps are as follows:

1. Pumped daily average of 500 bbls. of fluid, over 90 per cent water, continuously for 33 months. Other types of pumps formerly changed every two months or less. After 22 months of service, pump was repaired and reconditioned at a cost of only $80. This performance more than 600 per cent better than any former record.

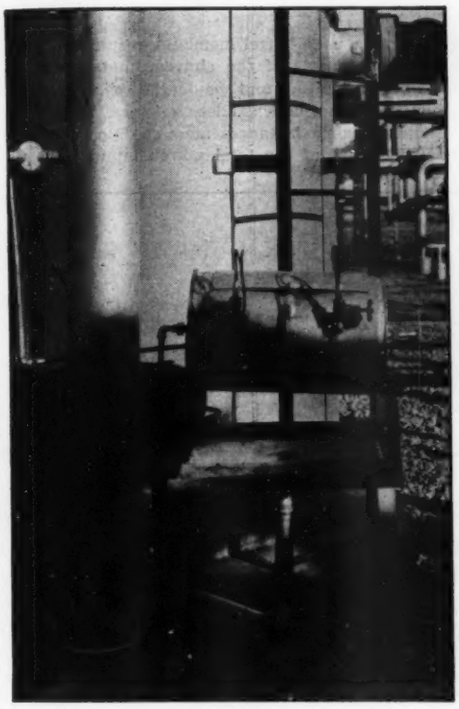
2. In Santa Fe Springs field, a 1¼-inch by 14-foot pump has been pumping 175 bbls. of fluid, over 25 per cent water, from a depth of 7,800 feet for a period of over six months and is still performing satisfactory service.

3. Huntington Beach field increased production in a well over 50 per cent daily average.

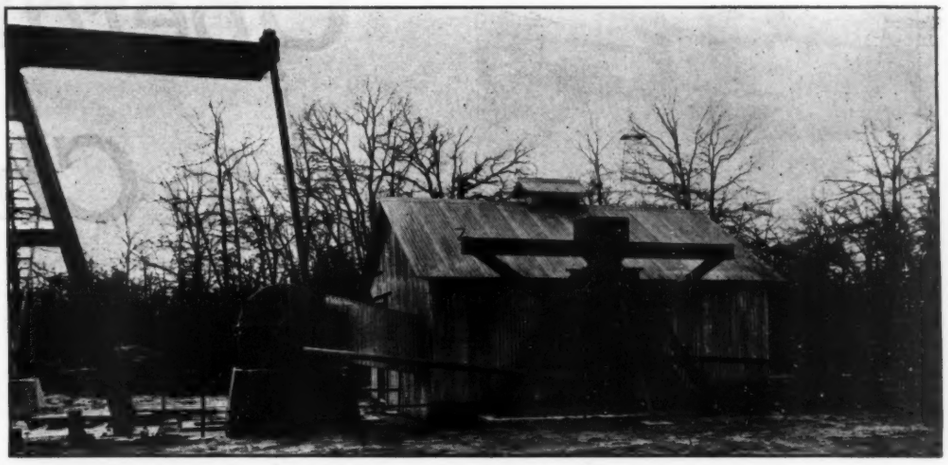
4. Signal Hill increased net oil production from 35 to 62 bbls. a day and gas from 16,000 to 40,000 feet a day.

OPERATING IDEAS

Cooling Mineral Oil Samples



One oil company operating a natural gasoline plant near Drumright, Okla., has installed a device for cooling samples of both the lean oil and rich oil to be used in determining the efficiency of the absorption system. This was done by using a cooling drum, made from a 5-gallon paint can, containing several feet of one-half inch piping in the form of a coil. Lines leading from the lean- and rich-oil flow lines are connected to the coil so that in sampling the oil it is only necessary to open either line and allow a small quantity to flow to the coils. The drum is kept filled with cracked ice, enabling the temperature of the sample to be brought down to about 30° F. before the samples are drawn from the coil. In this way the samples are not exposed to the air before they are thoroughly cooled, thereby preventing the escape of light fractions and allowing a more accurate distillation test to be made.

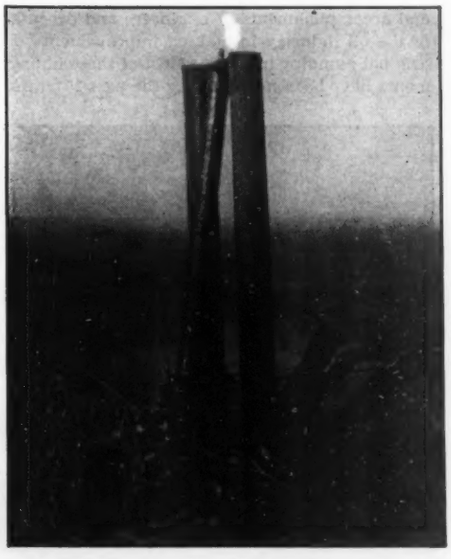


Pump Operated by Backside Crank Assembly

On this three-well backside crank hookup on a property in the Talco field, a separate pitman is extended from the two-way stroke post to a small crude oil pump which is used to move oil from the lease tanks to pipe line connection. This eliminates the need for a prime mover for the pump. Its load is not sufficiently great so that it may be hooked on the assembly at any time, regardless of whether one, two or three wells are being pumped.

Self-Oiling Stroke Post

A stroke post of novel design is being used by one Pennsylvania operator, the novel feature of the pendulum being that it is self-oiling. The post is constructed as follows: The upright outside casing is set in four feet of concrete. At the top is welded a 2½-inch pipe with the ends closed by welding a round plate over the opening. Over the 2½-inch pipe is placed a 3-inch pipe into which is welded the 3-inch traveling arm. The lower end of the 3-inch is closed by welding in a plate. At the top is seen a 1-inch pipe into which used oil is poured. The traveling arm is packed with waste so that the oil is allowed to seep through the waste and out through 1/64-inch holes bored in the pipe under the box. The swing at the top of the post is also oiled in the same manner.



Gas Line Supported by Bridge at Highway Crossing

This main gas-gathering line (16-inch) serving a natural gasoline plant in the south end of the East Texas field had to pass over or under the new paved highway built through the field. Due to the 20-foot cut at this point it was impractical to run the line under the road. Therefore, a small bridge, just wide enough for the gathering and return lines to rest on, was built across the highway and the lines placed on the bridge.

Operators More to Change Pro

Motor-driven combination V-belt geared pumping unit. Motor is 7½ horsepower. Note small amount of concrete used in foundation. Unit is operating in East Texas field

By L. T. GIBBS

Oil men generally are aware of the slowness with which radical changes are made in production methods. The writer will attempt to outline some of the important steps that have taken place in this regard with special emphasis on the latest methods of producing oil most economically.

Following is a brief description of the efforts and accomplishments of engineers and executives of the oil industry in making improvements over original pumping methods. Most of these improvements have been made during the past 15 years.

The first phase of these developments had for its primary objective power reduction. The elimination of down time was considered most essential. The established method of producing a well was to connect a prime mover (usually a horizontal slow-speed gas engine) through a countershaft to a bandwheel by means of belts. The practical use of this method in the field resulted in excessive losses due to friction in the aboveground equipment and abnormally high belt tension.

First Gear Units

The first step taken to improve upon this was to replace the countershaft between the prime mover and the bandwheel with a close-coupled reduction unit. These units assumed the form of a gear, chain, or V-belt unit. Among the first gear units the worm gear predominated for a time despite the relatively low efficiency of this type of drive in this service. Briefly summarized, it was necessary to incorporate such a large factor of safety in the worm gear in order to make this unit mechanically successful that it was replaced by other types. The latter could be worked at a lower factor of safety per dollar invested.

The use of the reduction gear progressed from this step to a spur gear and to a close-coupled chain-driven unit. Both of these units were successful, but the spur gears were superceded, especially for heavy wells, by the herringbone gear.

The next step was to eliminate the old style bandwheel by incorporating the crankshaft as a part of the gear unit. These units applied, for the first time, the advantages of antifriction bearings and the proper use of steel members, resulting in the component parts of the aboveground equipment remaining in line, and the overall result was a reduction in mechanical friction losses. These reductions in some instances amounted to more than 50 per cent of the total power input. The exact savings depended largely upon the mechanical condition of the rig replaced.

Low-capacity motor-powered pumping unit in Nowata, Okla., field

Coincident with the above developments, the old-type horizontal gas and oil engines were replaced by electric motors in some instances. The primary object at the time was to reduce the shut-down time and the amount of labor necessary to keep the engines and clutches in repair.

California Electric Installations

Due to the relatively low electric power rates in California, the increase in the use of motors in this early service was most pronounced in this territory. However, despite the cost of purchased power compared with cheap gas available on the lease, progressive oil companies in the Mid-Continent installed motors. They justified this by the reduction in down time, less repairs and less labor to more than offset the cost of electric power.

The above results are all the more startling when due consideration is given to the fact that the double-rated two-speed relatively expensive and relatively inefficient old-type oil-well motor was used.

During the development of this type of pumping unit all sorts of other oil-lifting devices were under consideration. These included hydraulic lifts, gas lifts, long-stroke pumping units, and even wire lines pulling 30- to 50-foot stroke pumps. The submergible electric motor, directly connected to a pump, was made a commercial success at about this time.

The second phase of the development of pump-

Mobile gas engine-driven electric generator unit (200 kw.) mounted on sled-type steel base, recently installed in Nowata, Okla., field for repressuring and pumping. Note space on skid for radiator if desired for water cooling

Willing cedure

ing equipment had for its objective the reduction of rod and pump troubles. At the same time some of the changes which were made in the first phase were greatly improved upon and more generously used. In studying rod service, dynamometer instruments came into standard use as a production instrument. It was at this time that importance began to be attached to the peak stresses placed in the rods and mechanical equipment at each reversal of direction of motion of the equipment.

The reduction in these stresses when using electric motors in comparison with gas engines was given just consideration and was the reason for some of the savings in operating costs where electric motors were used.

Types of Motors

Coincident with the above developments and about the time the first gear units were being installed, the writer among others, gave consideration to the use of a simple squirrel-cage motor in place of the conventional oil-well motor. Some of these were installed at various points in the Mid-Continent.

It seems strange at this time that it was difficult to get producers to use this simple prime mover, but in those days the average production man thought it was necessary to have an individual pulling arrangement on each well which required the use of the double-rated two-speed motor.

When the importance of the reduction of peak stresses in the rods and pumping units became apparent, various methods of reducing these stresses were tried. Vertical multicylinder high-speed gas engines were used which was a step in the right direction. The use of squirrel-cage motors together with pivoted motor bases. V-belts, etc., all combined to give beneficial results.

Some recent installations have proved that special motors having still greater slip or cushion effect could be used to reduce rod troubles. This forced the introduction of the latest phase in production equipment, the development of a reliable, economical, and mobile electric power plant.

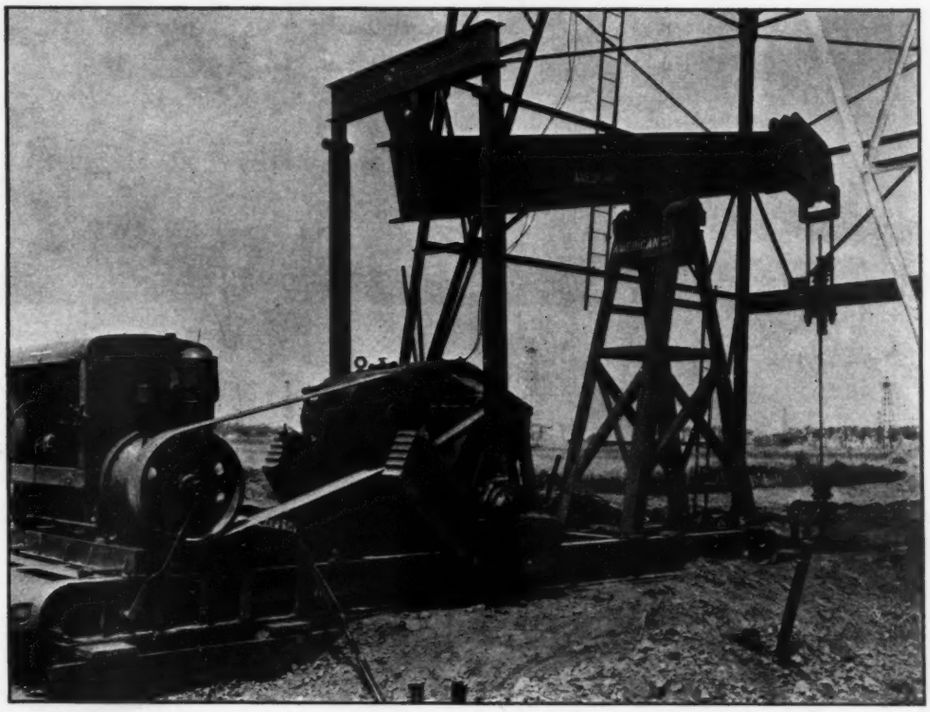
The writer at this point feels that it is proper to briefly touch on the development of oil-field power plants during the past 15 years.

Early Field Power Plants

The plants installed during the first part of this period consisted of slow-speed horizontal or vertical gas or oil engines directly connected to slow-speed generators. Costs for a complete power plant ran as high as $130 to $140 per installed kw.

During this period the engine builders progressed materially in the design of reliable vertical multicylinder high-speed engines, so that costs were reduced to figures as low as $70 to $90 per installed kw. Many plants were built in conjunction with refineries or gasoline plants, and these were often built at still lower costs.

Primarily, the production division of the oil industry requires small power plants, and the retarding factor to the installation of such plants has been the additional operating labor considered necessary. However, from the standpoint of labor costs, it is often easier to operate one or more large engines located at one point on the lease than it is to operate a large number of small engines, one located at each well.



Typical gas engine-driven pumping unit which illustrates trend in minimizing foundation costs which becomes of increasing importance with pumps of high capacity

The generating plants mentioned above are now being installed to operate a single lease or several in a given vicinity. The farm boss who happens to be in charge handles the operation of the power plant.

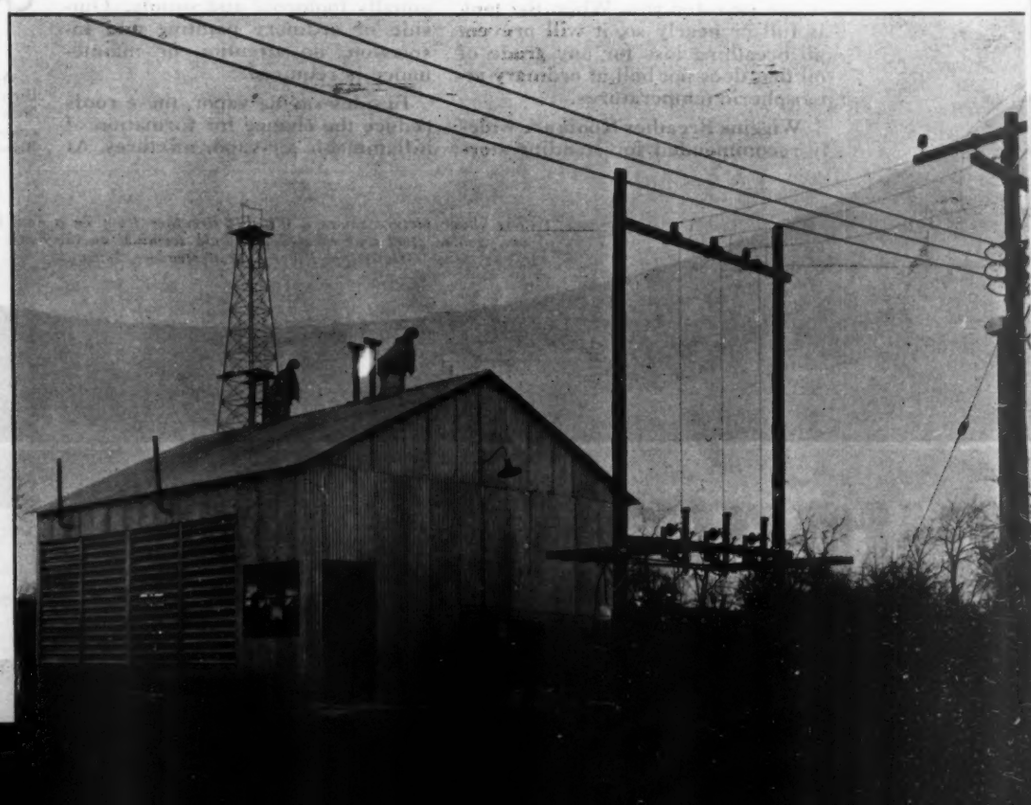
Changing Power Loads

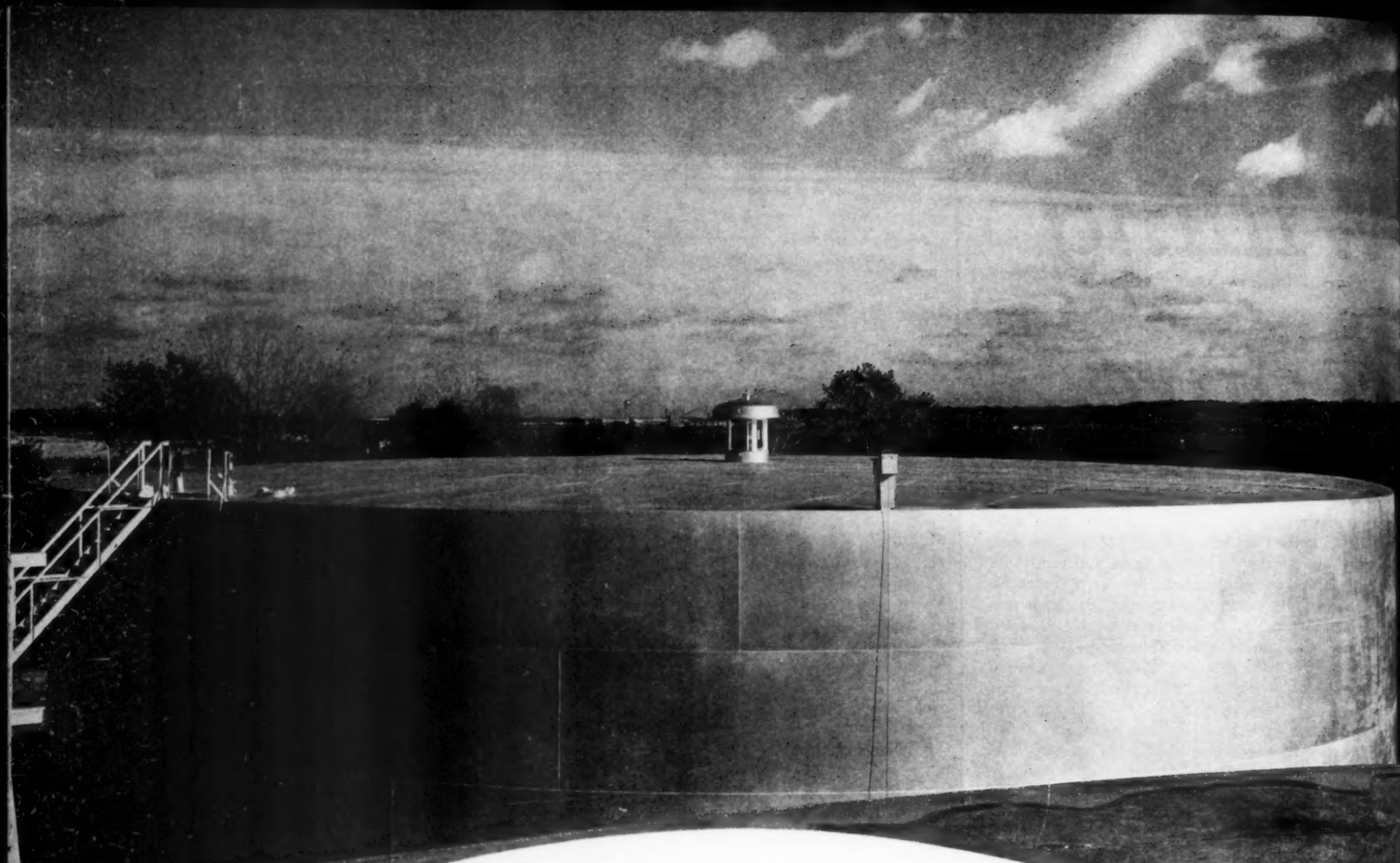
The next obstacle to overcome was the changing power requirements. This would vary from year to year. The usual course of the power curve would be a gradual increase as the properties were drilled up and placed on the pump.

After this point some properties would increase in power requirements while others would decrease, depending upon the amount of total fluid handled. The "fly in the ointment" was the fact that a plant built to take care of maximum power requirements would eventually be too large. When this occurred, the investment in the concrete foundations was lost and the cost of moving had to be borne.

This is being overcome now by installing a high-speed, lightweight engine generator mounted on

Exterior of new generating plant in Fitts pool of Oklahoma. The power is being used to pump wells in that area. Note that both high and low voltages are being used on the lease showing flexibility of this type of power





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Wiggins Breather Roofs are widely recommended for standing storage tanks 60 ft. or larger in diameter that are kept full or nearly full most of the time. Experience shows that they soon pay for themselves on crude oil as well as gasoline.

From an operating standpoint, the Wiggins Breather Roof is about the simplest thing in existence and the new breather control valve is equally foolproof and simple. Outside of ordinary painting and inspection, no attention or maintenance is required.

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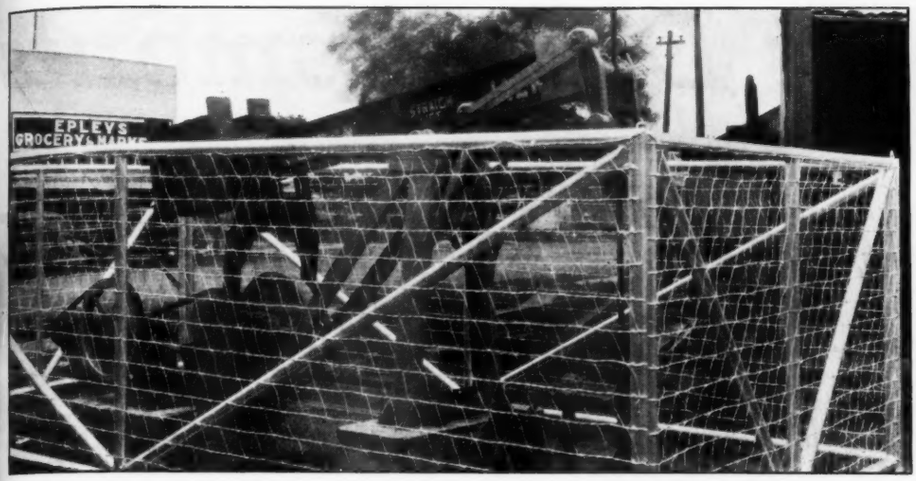
The above picture shows a Wiggins Breather Roof on a new 80,000-bbl. welded steel tank located at a bulk terminal on the bank of the Mississippi River near Bettendorf, Iowa.

WIGGINS BREATHER ROOF



Motor-driven unit installed in Burbank field to replace a horizontal gas engine and wooden bandwheel rig. Approximately 20 wells were similarly equipped. This was more economical than to replace original, corroded gas and water lines and associated equipment

steel skids of such a design that no other foundation is required.

In places where a supply of good water is not available, a sectional-type radiator may be mounted on the same steel skids with the engine and generator. If this is not provided a cooling tower may be used. The switchboard is usually of the self-supporting type and one is supplied for each generator. This piece of equipment also requiring no foundation. Its dimension and weight are held to a minimum and it can be placed usually in a corner of the power-plant building.

Low-Cost Buildings

The buildings used to house such units are usually very small and are sectionalized so that each building houses a complete generator unit.

The power plant is expanded as needed by the addition of complete engine-driven units. Unit sections of switchboards and unit sections of buildings are added so that, if, as and when, the power requirements of the properties being produced falls off, one or more, complete units with its associated switchboard and section of building can be removed and used on other properties at practically no loss in investment. This type of unit can be hauled in and installed in a few days and the same amount of time will move the unit.

The complete plan of oil production when installing such a unit calls for a reliable and mobile power plant consisting of one or more complete units as the requirements may demand together with secondary field transmission lines leading to the individual motor-equipped pumping units. The motor should be of the simple squirrel-cage type. With gas available on the lease for pumping purposes at no extra charge and with no additional labor necessary, the cost of operating one of these plants is considerably less than one-half cent per kw. hr. under reasonable load factors and on a 10-year depreciation basis.

Advantages of Plan

Some of the advantages inherent in such an operation appear to be essentially as follows:

1. Rod and cup life is longer due to lower peak stresses.

2. Minimum trouble with prime mover by using the proper type and size squirrel-cage motor and protective equipment.

3. Reduction in the amount of concrete used at the wells.

4. In a good many cases a smaller and cheaper pumping unit can be used due to the reduction of the stresses present.

5. Secondary power lines may be constructed aboveground where most of the investment is in copper wire and creosoted poles. The life of this material is almost unlimited.

6. The power plant consists of comparatively large and reliable engines, and generators and switch boards which practically have an unlimited life.

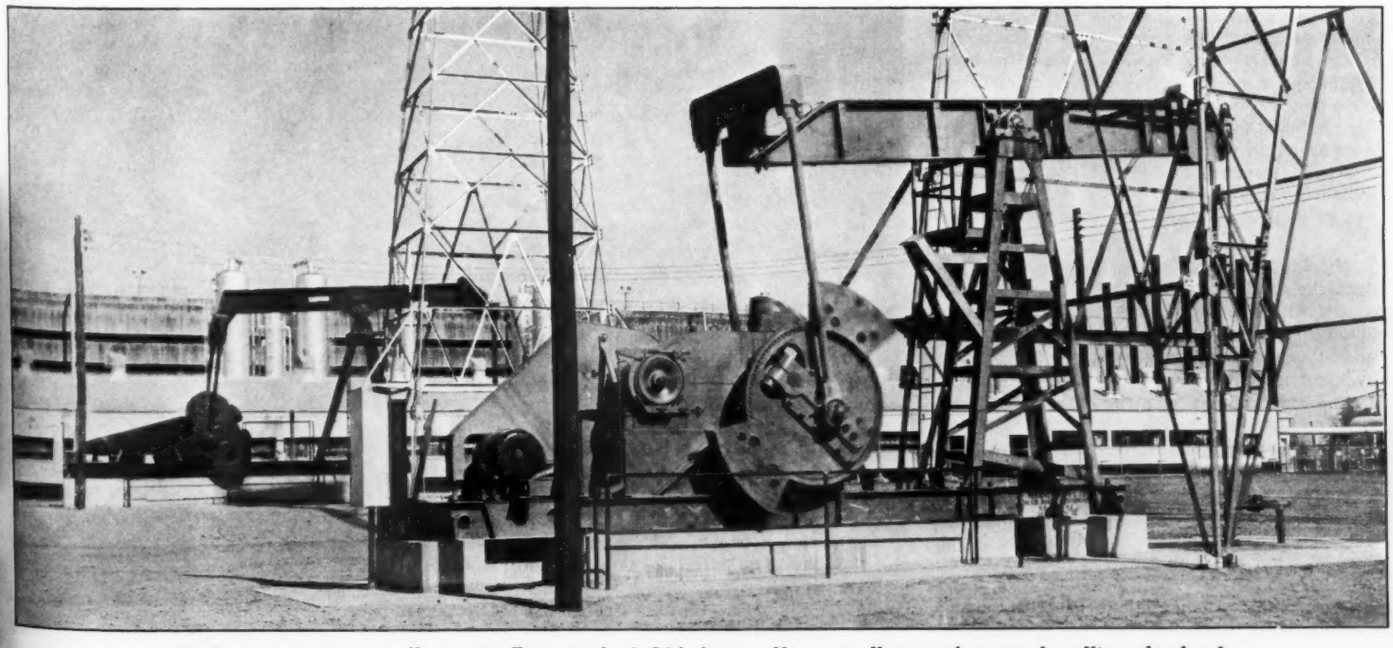
7. Practically all equipment can be salvaged at a small fraction of the cost of recovering gas lines, water lines, etc. The equipment recovered has sustained for practical purposes no depreciation and a slight amount of obsolence.

8. A point sometimes overlooked is the fact that when a lease is produced by this method a submergible electric pump can be used. There are instances where edge wells have gone completely to water when being produced on the beam. Then a submergible electric pump was installed and the oil production was brought up from nothing to as much as 1,000 bbls. of oil a day.

9. There are many times when it is desirable to lower or increase the strokes per minute on the wells. This can be done by either increasing or decreasing the frequency at the power plant if proper consideration is given to the type of prime mover used. Sooner or later on practically all leases it is desired to do this very thing and it can be done either continuously or intermittently if the installation is properly designed.

10. Labor costs are usually reduced. This method of production involves less labor as one pumper or farm boss can look after approximately twice as many motor-equipped wells as he can properly look after gas engine-driven wells. The reduction in pulling jobs results in less roustabout labor.

The writer feels the development of field generating units of the mobile type described here to be the greatest single step taken in the past 15 years to promote low-cost oil production. This type of unit appears to take most of the favorable engineering and mechanical features which have been developed in the past and to consolidate them in a unified whole.



Modern pumping installation in Fitts pool of Oklahoma. Note small size of motor handling the load

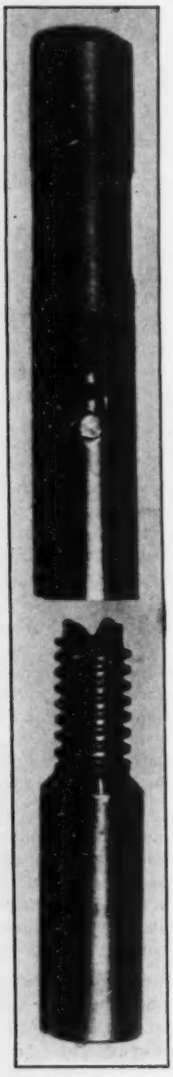


Fig. 1—Attachment to provide minus two fit

Recent Developments in Pumping Aiding Ark

The ambition of furthering the longevity and efficiency of subterranean pumping equipment in metal-to-metal seal working barrels has been developed to a remarkable extent following a period of extensive research and experimentation conducted by various companies and operators in the South Arkansas oil fields.

The South Arkansas fields, widely known for their difficult pumping problems, are probably afflicted with more diversified hazards than any similar petroleum producing area today. Pumping from four major horizons, subterranean hazards include excessive volumes of salt water, abrasive, floating and heavy sands, sulfide and other corrosive agents, underground vacuum, and high subterranean temperatures.

Operators find themselves handicapped, besides these subsurface hazards, with a large number of wells to service, rickety and obsolete surface equipment, crooked, faulty holes, and the one major problem—that of maintaining a profitable balance between expenditures and oil produced. Generally admitted by operators of South Arkansas, the problem of obtaining longevity and efficiency from subsurface pumping equipment is one of the more serious. Although, of course, a wide variance in working barrel lifetime is found in different wells—according to the severity of the particular adverse subsurface condition—the general average of South Arkansas wells necessitates a pull job for working barrel repair or adjustment about once every 15 days per well.

Metal-to-metal seal working barrels offered, perhaps, the maximum of efficiency but were handicapped with extremely short life, with numerous follow-up plunger changes starting often with a seven-thousandths clearance and ending up with five- to ten-thousandths oversize.

The general practice among operators was formerly to install a liner barrel 7 feet long, equip it with a 6-foot plunger of five-thousandths clearance (minus five) or smaller, and then changing plungers rapidly as wear took place to a minus three, minus one, plus one, plus three, plus five, and larger. The barrel remained in the hole during these changes and plungers were replaced with rod jobs.

Operators have long realized that with the possible exception of extreme abrasive conditions, slippage or plunger leakage is responsible for greater working barrel wear than any other factor. The plunger, with vertical actuation in the working barrel, bears the entire weight of the column of fluid. Slippage or plunger leakage is the inability of the plunger in the barrel to hold perfect enough seal to support this weight without leakage. In other words, the fluid surging back under tremendous pressure through the plunger-liner clearance so washes away these sealing surfaces as to increase clearance.

Fig. 2—Testing working barrel for correct alignment

As this slippage condition persists, plunger wear up to thirty-thousandths has been known to take place in less than 15 days. Similar wear is also found in the liners.

Experiments have proved that efficiency and production volume are in direct relation to the fit or clearance of the plunger. The control of slippage or plunger leakage was readily seen to be in the use of a plunger seal of the least possible clearance. Application of a plunger fit of one-thousandth inch clearance was known to have been used sucessfully in deep-well liner barrels and insert pumps.

However, in attempting to apply a plunger with this extremely close fit to a larger "Parker" or "Tubing-Type" barrel, South Arkansas operators encountered numerous unlooked-for difficulties. Among these difficulties, perhaps the most serious was the jamming or sticking of the plunger in the barrel. Then, too, higher subterranean temperatures promoted galling and shearing of the plunger. Cracked liners, due to expansion and strain, frequently occurred.

About this time John B. Duffield, engineer with Lion Oil & Refining Co., in cooperation with pumping manufacturers, introduced a series of experiments which laid the foundation for most of the work being done in the field today.

In the first attempts of running the closer-fit plungers, the 7-foot barrel of cast iron liners with a 6-foot steel plunger was used. When this combination of equipment was pressed to fit closer than four-thousandths (minus four) the aforementioned sticking, jamming and burning occured. This was due, no doubt, to friction heat produced by stroking motion, natural subterranean temperatures, or both.

Chromium-plated plungers, well known in various parts of the country for their resistance to acid and corrosion and their low coefficient of friction, were next applied with considerably better results. The chromium-plated plunger was apparently able to withstand the effects of heat without expansion, but in many instances failed to stand up and wear as well as expected. For some time this was believed to be the fault of the chrome plating itself. However, this was shortly proved not to be the case. With the 7-foot barrel and 6-foot plunger it was discovered that the plunger, upon completion of the upstroke, had only a portion of its length anchored in the barrel. Then, with the downstroke, the plunger underwent a buckling strain which cracked and loosened the chrome plating. This situation was reme-

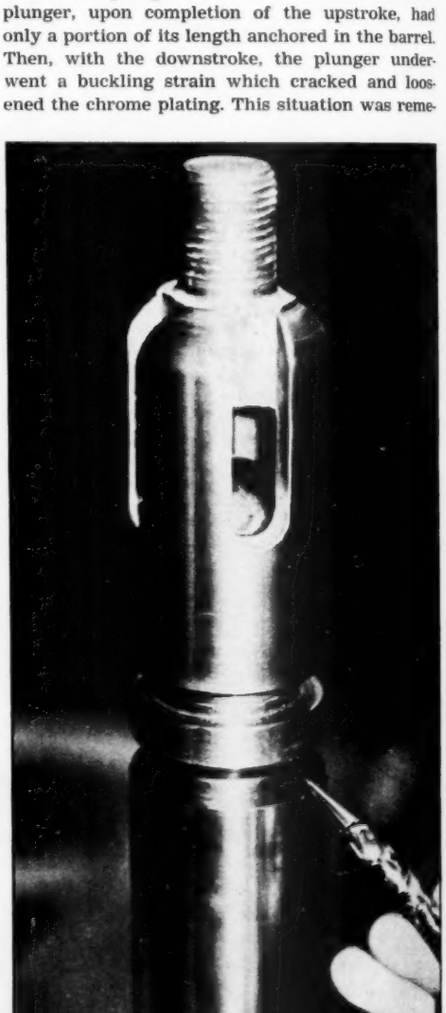


Fig. 3—Showing scraping edge of special plunger used in sand conditions

in Shallow-Well ansas Producers

died, however, with the introduction of the 10-foot barrel and 4-foot plunger. When spaced properly, the plunger was allowed to stroke only inside the barrel, protruding very little, if at all, from either end.

This proved the ideal solution of the problem and with the close-fit plunger many remarkable records are now resulting.

Although many fine points were to be worked out, at this point in the work some comparisons of records were made. For instance, one particular well, of Woodley Petroleum Co., employing the old style of barrels and 6-foot steel plunger, had a plunger life of about 15 days. That is, in starting out with a minus seven plunger in this well it was necessary in a short time to change to a minus five, thence to a minus three and on into the follow-up oversize plungers. The average life of a plunger in this particular well was, at best, 15 days. Consequently the life of the barrel with six plungers was three months.

It was believed that if this well could be operated with a clearance of only two-thousandths of an inch as a starting plunger instead of seven-thousandths, that destructive slippage would be so minimized as to allow the one plunger to run as long as the other six combined. With the combination of the 48-inch chromium-plated minus two plunger and a 10-foot barrel of hard liners (370 brinell or more) it was found, surprisingly enough, that not only did the barrel run without plunger change for five months but an average percentage of volumetric efficiency during this time was approximately 81 per cent.

A number of kinks had to be worked out, however, in the successful operation of this close fit and many new methods were developed which were later applied to other types of working barrels with equal success.

As an example, the running of the plunger down through the tubing string in the ordinary way was found to be impractical. Running the new, highly polished naked plunger in on the rods often scarred and marred its smoothly machined surfaces. The use of an automatic attachment (Figure 1) was found highly efficient here. With this attachment the plunger, complete with all its fittings and valves, is run together with the barrel on the end of the tubing. The rods alone are then run in and, with the aid of the attachment, securely screwed and latched to the plunger. In this way not only is the plunger completely protected, but foreign bodies are also prevented from falling into the bottom of the working barrel.

Another method of plunger installation is described as follows: After the tubing, complete with working barrel and standing valves, has been run into the hole the tubing is filled with water or oil. The plunger is then slowly run in on the rods. Special care is exercised when it is believed to be about to enter the barrel. The water or oil in the tubing string acts as a cushion for the plunger on its descent and this, coupled with running the plunger in carefully, eliminates to a great extent possible damage to the plunger surfaces.

It might be mentioned here that coating the plunger with heavy grease before lowering into the tubing string is not recommended. The reason for this is that dirt, scale, etc., found inside the tubing will adhere to the heavy grease and the plunger by the time it reaches the barrel is encrusted with this foreign material.

A large rod guide of some description is used on the end of an 8-foot or longer rod sub that connects to the plunger. The guide aids in keeping the plunger more perpendicular on its journey down the tubing when this installation method is used, and the long sub is necessary to insure against the guide striking inside the barrel—with the possible danger of damaging the barrel's interior. It is not deemed advisable to use two or more short subs to make up this 8 feet as the connecting boxes of the short subs are likely to hammer against the inside of the liner barrel walls in striking with the possibility of knocking the barrel out of alignment.

While on the subject of alignment of the liners in the liner barrel, it is well to remember the critical importance of a perfect alignment of these liners for use with the minus two fit. Although the responsibility of barrel alignment is usually invested in the pump company handling the operator's business, the operator personally should insist on a special care in the work of alignment for these extremely close fits.

Inspection of the jackets and collars of the liner barrel should be made. The 10-foot liner jacket should be perfectly true, honed and pol-

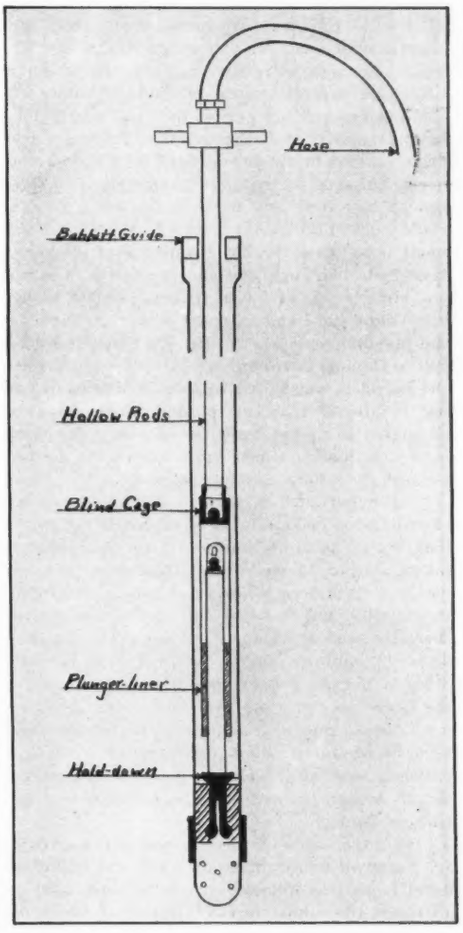


Fig. 4—Diagram of hollow-rod equipment

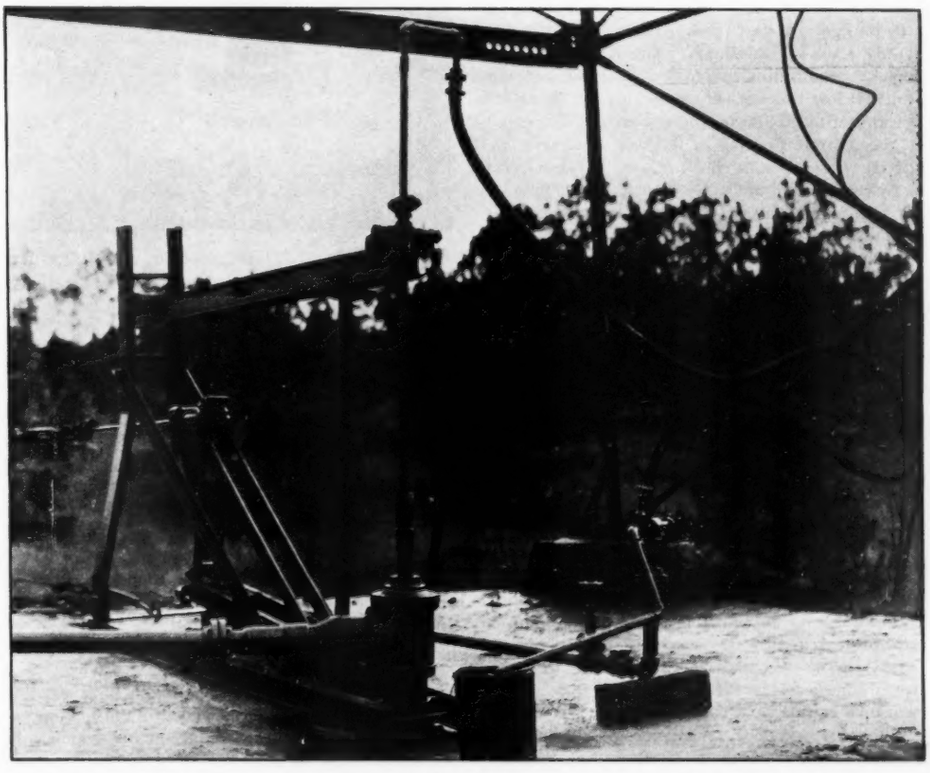


Fig. 5—Surface equipment used in hollow-rod installation. Note flexible hose

ished on the inside, and free of crimps and bent places. The collars should have smooth, finely polished facings and, of course, good threads. The liners should be of quality manufacture of which there are several makes available. Hardness of about 370 brinell has proved the most satisfactory for the majority of conditions. After the liners have been inserted in the jacket, lined with lining mandrels which allow not more than one-half thousandth clearance, and the collars made up to the right tension, the barrel is tested for perfect alignment as follows: (Figure 2) one end of the barrel is cocked to an angle of about 15 degrees. A minus one chrome plunger with fittings is oiled with a very light lube and inserted into the barrel. If this test plunger floats through the barrel from one end to the other without hesitation or impedance, the barrel is considered in correct alignment and not before. If this test plunger does not float through with ease of its own weight only, the pump is broken down, cleaned and relined until the test plunger does float through perfectly.

The importance of perfect alignment as mentioned above cannot be overemphasized. Care in handling so as to not bump or drop the pump on its way out to the well or in handling by the crew on the derrick floor is also essential. In making up the nipples and standing valves on the derrick floor, the well-servicing crew should be cautioned against turning the pump collars or in rough handling of the pump itself. Apparently the liners in the liner barrel are much more susceptible to being knocked out of alignment while the pump is in a horizontal position. However, in a vertical position, as when traveling down the hole, a liner barrel seems to withstand considerable abuse without damage.

The advantages of this chrome minus two fit are found in many different ways and might be listed in part as follows: (1) In moving sand of all types, the minus two or virgin-fit plunger offers distinct assistance. In the first place, with the clearance between the O.D. of the plunger and the I.D. of the liners being cut down to only one-thousandth of an inch with a minus two plunger, this extremely small space does not allow sand to pack or accumulate which eventually "freezes" the plunger in the liners—resulting in the commonly known "sanding-up" job. Also, due to the fact that the minus two offers a perfect seal, with no fluid lost through slippage, all fluid pumped is actually lifted. This results in a greater up-velocity of the current. Because of the fact that there is an increased velocity of the fluid in the tubing, sand is carried up and out more readily.

A special adaption to the minus two plunger when sand conditions are encountered is in the use of a sand scraping edge. (Figure 3): This sharp edge or lip is said to scrape sand from the liner sidewalls and is then washed out by the fluid. Plungers machined with this special scraping edge are obtainable in various types from several major pumping equipment suppliers.

(2) Whereas with the former loose-fitting plungers it was considered practical to expect about 60 per cent volumetric efficiency with a new barrel and plunger, it is now possible to expect in the neighborhood of from 85 to 95 per cent volumetric efficiency—dead lift. Practically no slippage is allowed with the close fit.

(3) Undoubtedly the most important of these advantages is the comparative longevity with control of slippage. Runs of from three to five months without change of plunger are quite common in the South Arkansas fields, whereas before, in the same well, it was necessary to change to larger size plungers every 15 to 30 days to take up the clearance caused by wear.

Probably one of the most ingenious as well as practical methods of sucessfully pumping stripper wells of bad sand conditions is in the use of hollow sucker-rods which several South Arkansas operators are employing today. Although restricted of course to stripper wells producing less than 50 bbls. per day, the method nevertheless revived many wells which had been abandoned for years and offered others, for the first time, the opportunity of showing a satisfactory profit.

The theory behind the use of hollow sucker-rods is that by confining the fluid to passages of small diameter a greater fluid velocity is obtained. This powerful up-velocity of the fluid in the well efficiently carries out sand of large and heavy granules—moving as much as 40 per cent in many cases.

Use of Hollow Rods

The sketch in Figure 4 shows the equipment used and consists of the following: An ordinary type insert working barrel is anchored to the bottom of the tubing string in the usual fashion. The pump is connected by means of a valve blind cage to a string of 1-inch tubing which takes the place of the solid rod-string ordinarily used. No stuffing box or polish rod is used at the surface but the string of 1-inch tubing is secured by a grip to the jack or beam. Any one of the conventional polish rod type grips are used with the center hole bored larger to accommodate the 1-inch tubing. A length of steam hose, usually 1-inch I.D., is connected by means of a flange to the top of the hollow rod string where it protrudes above the grip. The other end of the hose is connected to the stock tank lead line. Figure 5 shows these surface equipment connections.

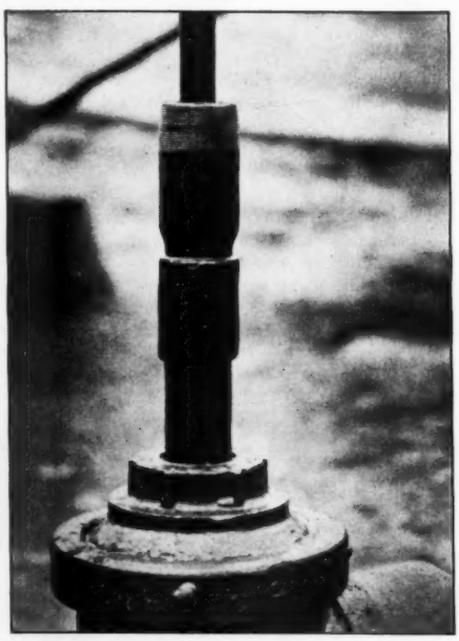


Fig. 6—Babbitt-filled swedge nipple which acts as a guide for the hollow rods

The fluid entering the standing valve of the working barrel is reciprocated into the string of hollow rods through the valve blind cage. The fluid confined inside the 1-inch tubing builds up a high pressure which literally blasts sand to the surface. This pressure is such that if the steam hose connection at the surface is uncoupled, the fluid will shoot 20 to 40 feet in the air. The hose allows flexibility enough to conform with the stroking motion.

South Arkansas operators when first experimenting with this method encountered a number of difficulties, the most troublesome of which was the breaking of the hollow-rod string itself either above or below the collars which connected the joints. This problem was remedied through the use of extra-heavy 1-inch tubing strings and long extra-heavy connecting collars. With this combination of equipment breaks are minimized.

Further difficulties were experienced in the stock tank lead lines. It was found that the large volume of sand which the hollow sucker-rods lifted would sand up in the larger lead lines as these greater dimensions permitted the fluid pressure to drop. In many cases it was found necessary to run 1-inch lead lines direct from the well to the tanks in order to maintain sufficient pressure.

With the exception of the equipment already mentioned, few changes were necessary in the installation of hollow rods. Some operators find, due to rickety surface equipment, that considerable vibration and quivering is set up where the rods run out of the tubing head. This fault was aided through the use of an ordinary swedged nipple (Figure 6) filled with babbitt and a hole bored through the babbitt slightly larger than the hollow rods. This acts as a guide for the stroking rods and is screwed into the tubing head. It might be mentioned here that for pulling jobs a set of special elevators is required. Ordinary rod elevators bored out large enough to accommodate the 1-inch tubing are used.

Among the disadvantages of the use of hollow sucker-rods the most outstanding is, of course, in the limited volume of fluid successfully handled. Fifty barrels per day is considered the maximum amount which a hollow string will efficiently handle. As a means of cleaning out a particularly sandy well, hollow-rod strings have proved a highly successful and efficient practice. Allowing the well to pump over an extended period of time with the hollow rods will usually remove all loose sand unless the supply (as it is in many Arkansas instances) is inexhaustible.

Wells equipped with hollow sucker-rods are said to be practically impossible to sand up so long as the well is kept in motion. Although it is true that sanding-up jobs have occurred this is usually due to the well being shut down for some cause for an extensive period of time allowing the sand to settle out of the fluid column. When this occurs the rods are removed and those which are packed with sand are set aside and cleaned with water pressure. A length of quarter-inch pipe connected to a water line and inserted into the sanded-up hollow rods assists in washing out the packed sand.

The power output necessary to pump a well equipped with hollow rods is slightly higher than that necessary for a similar well equipped with the regular solid rods. The reason for this is that, in as much as the string of hollow rods travels at all times inside a dry tubing string, no fluid buoyancy is afforded and surface equipment is required to lift dead weight.

Working barrels generally recommended by South Arkansas operators for use in connection with hollow sucker-rods are solely of metal-to-metal insert type either multiple steel tubes or plunger-liner seals. Cups, packing, composition rings and the like do not prove as efficient, as the large volumes of sand handled usually cut off these comparatively softer materials. Pump life, even in metal-to-metal seal working barrels is limited in these extremely abrasive sand conditions, but due to the small volume of fluid handled, working barrel volumetric efficiency is not as important as it might be in other cases. The use of close-fit plungers as discussed previously in this article can be applied to small-bore plunger-liner insert pumps in use with the hollow rods.

The hollow rods themselves are, as mentioned previously, extra heavy grades of standard 1-inch tubing, and are procurable from any major tubing supplier. The extra heavy collars are also standard equipment and easily procurable from one of several concerns.

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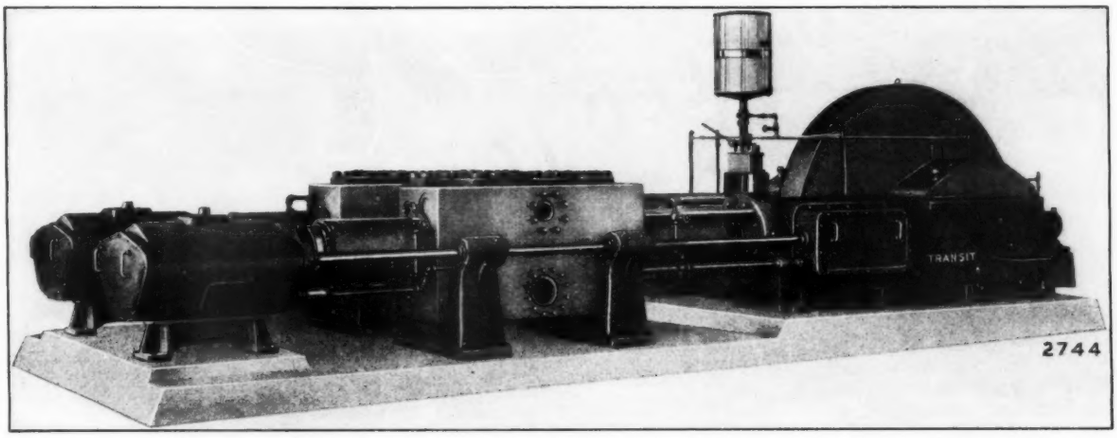

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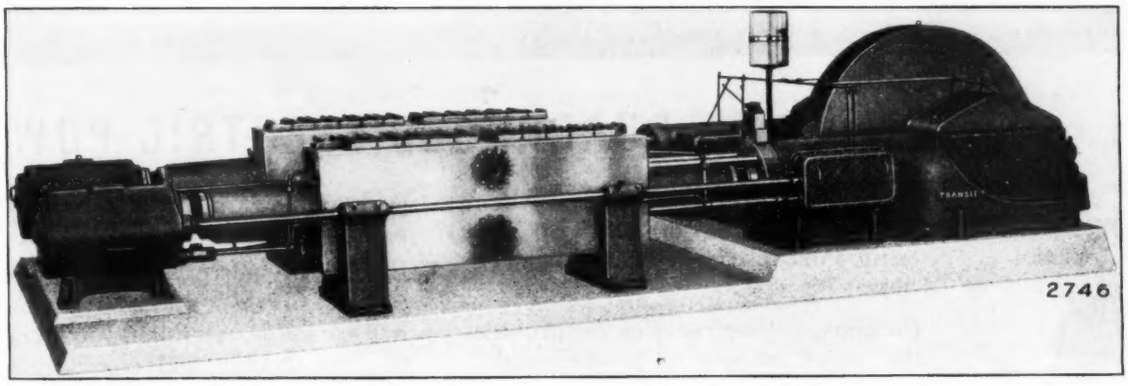

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Effect of Paraffin Hydrocarbons on the Determination of Carbon Monoxide

By K. A. KOBE and N. R. DUNBAR
University of Washington, Seattle, Wash.

When the percentage of carbon monoxide in a gas sample is 0.1 per cent or less, the usual absorption or oxidation methods are of no value as the contractions cannot be measured accurately. The iodine pentoxide method based on the reaction $5\ CO + I_2O_5 \rightarrow I_2 + 5\ CO_2$ is used most frequently. However, other gases react with the reagent and a purification train is used to remove them. The saturated paraffin hydrocarbons are not removed by any chemical method which will not also affect the carbon monoxide. The object of this work is to study the effect of these hydrocarbons on the accuracy of the determination.

Previous Research

Nicloux[1] first investigated interfering gases and concluded that neither hydrogen nor methane reacted with iodine pentoxide, but that hydrogen sulfide would react. These results were verified by Kinnicutt and Sanford[2]. Graham[3] found methane unattacked, and n-pentane in quantities less than 0.2 per cent only slightly attacked. When larger quantities of pentane were present the attack was more pronounced and the error dependent on the time of exposure and the temperature of the iodine pentoxide. However, Teague[4] in his investigation of motor exhaust gas found that when hydrogen was equal to half the carbon monoxide no difference was noted, but when the hydrogen increased to twice the carbon monoxide that slight oxidation occurred. Gasoline caused considerable reaction and liberation of iodine to give high results. Teague remedied this by placing a liquid air trap in the absorption train to freeze out the gasoline vapors. This method is the procedure recommended by the Bureau of Mines.[5] The method of Vandaveer and Gregg[6] is recommended by the American Gas Association. They found no oxidation with hydrogen, methane or ethane.

Method and Apparatus

Method and the apparatus consisted of a Morehead buret, aspirator bottle, purifying train of concentrated sulfuric acid and solid potassium hydroxide bulbs, the iodine pentoxide tube heated in a paraffin bath and the iodine absorption tube containing potassium iodide solution. The liberated iodine was titrated with .001 normal sodium thiosulfate solution.

The aspirator bottle was calibrated with 12 liters of uncontaminated sample. The iodine pentoxide line was purged by running 8 to 10 liters of uncontaminated air through the system under operating conditions.

Hydrogen, methane and ethane were obtained from commercial cylinders. Propane was that used for solvent refining of oil. Heptane was of technical grade.

Results

Results are expressed in equivalent volumes of carbon monoxide per 1,000,000 volumes of gas mixture, or v.p.m. Blanks were determined in the usual way and found to be well below the usual accuracy of this apparatus.

Oxidation of Hydrogen. Gas mixtures contained 0.1, 1.0 and 2.0 per cent hydrogen, approximately 4 liters being used for an analysis. The results are given in Table 1.

Hydrogen below 0.1 per cent would not affect an analysis, but amounts in excess of approximately 0.5 per cent would affect the results. A hydrogen determination should also be made when this gas is present so that the accuracy of the carbon monoxide determination can be estimated.

Oxidation of Methane. Gas mixtures contained 0.1, 0.17 and 2.0 per cent methane, approximately 3 liters being used for an analysis. The iodine pentoxide temperature was constant at 150° C. No reaction was found with methane.

Oxidation of Ethane. Gas mixtures contained 0.1, 0.2 and 1.0 per cent ethane, approximately 3 liters being used for an analysis. With 1.0 per cent ethane some reaction took place. However, its extent was about the same as the accuracy of the determination. Vandaveer and Gregg[6] report no oxidation of ethane in gas containing 0.08 per cent ethane.

Oxidation of Propane. Gas mixtures contained 0.1, 1.0 and 2.0 per cent propane, approximately 3 liters being used for an analysis. With 1.0 and 2.0 per cent propane, reaction took place to an extent greater than with ethane. However the extent would not appreciably affect the results so that unless propane is present in large amounts it may also be neglected, although propane might be termed the dividing point in the hydrocarbon series with those above it definitely interfering.

Oxidation of Heptane. Gas mixtures contained 0.1 and 1.0 per cent heptane, approximately 3 liters being used for an analysis. Iodine pentoxide was at 150° C. and rate of flow was 1 liter per hour. This hydrocarbon is readily oxidized and even traces will seriously affect the results of a determination. The results are given in Table 2.

TABLE 1—GAS MIXTURE: HYDROGEN IN AIR

Analysis No.	1	2	3	4	5	6	7	8
Hydrogen, per cent	2	2	2	1	1	1	0.1	0.1
Rate, ml./hr.	1000	500	130	1050	1000	1000	1000	570
Temperature, °C.	150	150	150	120	150	180	150	150
V.P.M. CO	22	136	55	13	27	23	3	0

TABLE 2—GAS MIXTURE: HEPTANE IN AIR

Analysis No.	1	2	3	4
Heptane, per cent	0.1	0.1	1.0	1.0
V.P.M. CO	950	1200	1100	2500

In all analyses iodine crystals formed in the connections so that all results are low despite efforts to wash the connections clean.

Effect of Contact. In the runs with ethane, propane and heptane the effect of contact of the gas with iodine pentoxide was striking. If the gas were allowed to remain in contact with the iodine pentoxide when a run was stopped the next run would show an abnormally high iodine liberation. This was particularly true of heptane, in which case iodine crystals actually formed in the iodine pentoxide tube. It is recommended that the apparatus be thoroughly flushed out with air before the iodine pentoxide tube is allowed to cool.

Removal of Hydrocarbons. Teague[4] used a liquid air trap in his purification train to remove traces of gasoline vapor from contaminated air. Such a trap is necessary when the higher hydrocarbons are present as they decrease the accuracy of the determination. To replace the liquid air by solid carbon dioxide is not possible as calculations for butane show. If cooled to —75° C. butane has a vapor pressure of 15 mm., so that an air-butane mixture would still contain 2 per cent butane, which would destroy the accuracy of the determination.

Conclusions

1. Hydrogen below 1 per cent will not affect the accuracy of the determination; above this a slight effect is noted.
2. Methane does not affect the determination.
3. Ethane and propane in quantities above 1 per cent have a definite effect on the accuracy of the determination.
4. Hydrocarbons above propane should be removed in a liquid air trap to insure the accuracy of the determination.

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A.S.T.M. Index Published

The latest edition of the Index to A.S.T.M. Standards and Tentative Standards, giving information on all of the 823 standards as of January 1, 1938, has recently been published by the society. The index is of service to anyone wishing to ascertain whether the society has issued standard specifications, test methods, or definitions covering a particular engineering material or subject and it is of help in locating the standards in the volumes where they appear.

All items are listed in the index under appropriate key-words according to the particular subjects they cover. As a convenience a list is given of the specifications and tests in numeric sequence of their serial designations. Copies of this publication are furnished without charge on written request to A.S.T.M. headquarters, 260 South Broad Street, Philadelphia, Pa.

Study of Producing Formations Assisted by Graphic Well Records

By H. L. KIRKPATRICK
Arkansas Fuel Oil Co.

With the extensive development and consistent progress that has been made in deep-well drilling in the past few years, more attention than ever is being paid to various methods of recording the information that has been obtained by drilling. The importance of well records assumes a great deal of significance when it is considered that the large investment cost in drilling deep wells is not at present sufficiently comparable to the small expenditure and lax supervision generally assigned to recording and preserving data which may be the sole return on investment for wells drilled in unproductive areas.

It is apparent even to the casual observer that over a period of years considerable development has been made in compiling standard or general types of well records, and some operators have felt the need of the adaptation and development of more comprehensive and detailed well records in keeping with present-day progress. The standard types of records, such as cross sections, subsurface contour maps, well logs, etc., have for a number of years played an important part in field development.[1] These records, still essential and fundamental, have been supplemented to some extent by more detailed and specific graphic records. These graphic records are, generally speaking, an adaptation or combination of standard types of records and include in addition more recently developed engineering data such as core analyses, electrical logging determinations, and the like. Therefore, the system and procedure of graphically recording well data is becoming an important function of the geologist and the petroleum engineer. Records of this type accomplish a dual purpose in serving the geology and production departments for correlation and completion data, formation and production studies, well repairs, evaluation data, and other geology and engineering work which has its foundation in well drilling.

Changes in Methods

The exploration and development of any new field has never failed to cause a constructive change in drilling and production methods, and to show the possibilities of applying this experience in future development. The compilation and assimilation of this information leading to these changes is too often a haphazard and costly period of transformation. The Rodessa field, which is located in northwestern Louisiana, northeastern Texas and southwestern Arkansas, is a particularly good example of how the proper analysis and recording of well data can serve to materially decrease excessive development and exploration costs. This field produces from the top of the Lower Glen Rose of the Lower Cretaceous. The producing section or principal reservoir in the field proper is an oolitic or coquina lime of varying porosity, saturation and permeability. Clough,[2] Horner[3] and others have discussed the importance of core analyses, and this variance, particularly in permeability, has shown from actual field experience that core analyses are major factors in successful well completion. One principal problem has been to complete wells below the gas-oil contact and prevent excessive quantities of gas to be produced with the oil.[4] In some portions of the Rodessa area there is a separation of the gas and oil zone by a shale section. However, where this is not present it is necessary to set the casing below the contact or saturation level so that sufficient fluid seal can be effected. This, of course, makes it especially important to determine accurately the saturation tops, and carefully measure casing strings. In some cases, even when wells are cased below the top of the saturation, other formation hazards are present. It has been determined from actual field observations in connection with core analyses that formations having porosity and saturation, but having a lower permeability, will produce excessive quantities of gas in preference to oil.

In view of these previously discussed singularities it became apparent that to drill and complete wells successfully there was an essential need to make an intelligent comparison of the characteristics of the producing section with the procedure and practice of well completion. In order to picture completely and accurately these variable conditions, it seemed advisable to devise a graphic record which would include salient features, namely: Casing, liner, tubing and other completion data; an individual cross section showing formation sequence and saturation tops; and a graph of the core test determinations for porosity and permeability. These items were to be referred to their actual subsea depths to permit comparison of one well to another. A typewritten record of more detailed information as to core descriptions, the complete laboratory analysis of the cores, and other information incidental to geology and production data such as coring points, per cent core recovery, marker horizons and acidizing and perforating essentials was to be prepared as a supplement to the previous graphic record which did not permit such complete detail. Figure 1 and Table 1 illustrate typical records as described, and are of course hypothetical examples.

In assimilating the various facts necessary for compiling formation records there are several preliminary records which are essential for immediate usage prior to the actual completion of the well. As the well is drilled, the district petroleum engineer is responsible for recording and communicating pertinent information to the general office. This information, such as a complete description of the casing, liner and tubing, including depth, size and weight in pounds per foot, is obtained at the well site, with formation tops and other geological data secured from the field geologist. During coring operations the petroleum engineer works directly with the field geologist in recording and preserving core samples.

Handling of Cores

In order that there will be no evaporation and contamination of the saturated samples in transporting them from the well to the laboratory, these samples are sealed in tin cans. Since the advent of test wells for connate water determinations, va-

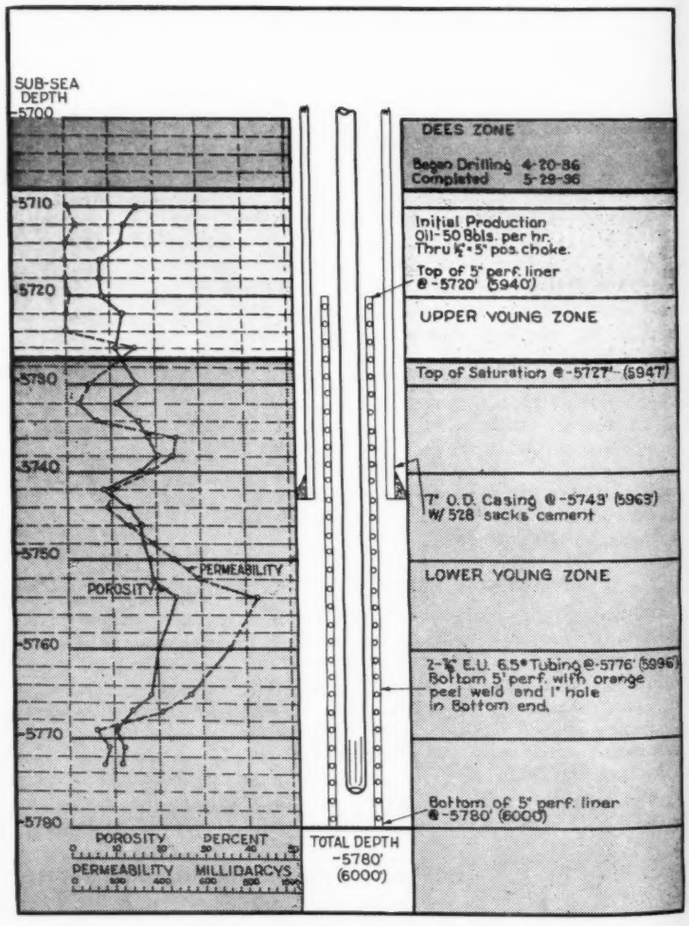
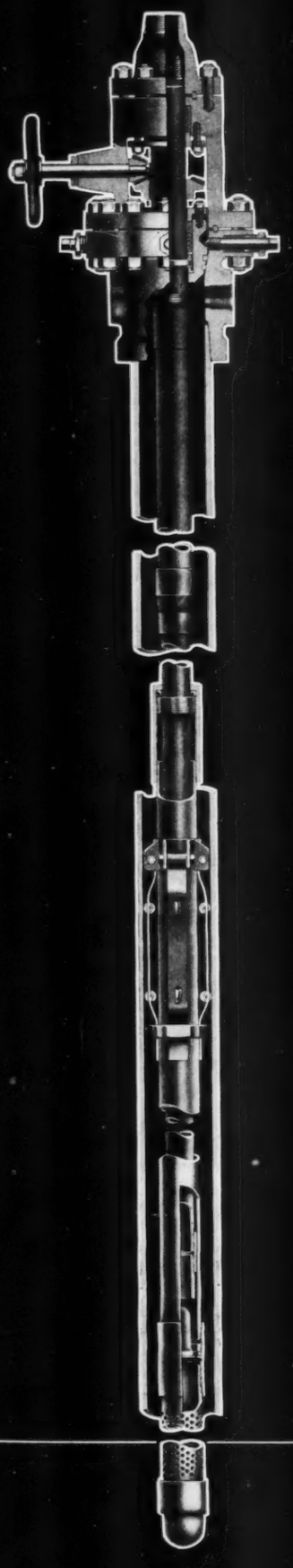


Fig. 1—Graphic well record of "J. W. Smith No. 1"



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rious methods have been used to prevent contamination and evaporation of core samples. The use of fruit jars, wax and cellophane are well known methods of preserving samples, however, the utilization of a simple household canning apparatus, and hermetically sealing the cores in tin cans, has proved to be a simple, inexpensive and efficient means of protecting the cores in transit.

When the core samples have been analyzed and reported by the laboratory, this data is plotted on graph paper, to picture the comparative determinations at their respective depths. This graph is sent immediately to the production superintendent, the chief geologist, the district petroleum engineer, the field geologist, and the field superintendent in order that the record will be available for a determination of casing depths, perforating points, acidizing zones, etc. This graphic record of the detailed core analyses allows for a comprehensive, accurate and convenient conception of the characteristics of the formations penetrated.

When the well is completed the graphic records and the supplementary typewritten record are prepared from the sources as outlined previously. In designing the system and procedure of preparing graphic well records the primary problem was to find a quick, simple and effective method of recording, which would allow for the reproduction of a number of white prints. This method was finally completed by drawing the completion and core analysis data on inexpensive tracing paper. The use of tracing paper likewise allowed for typing such descriptive information as was necessary on the graphic record and obviated the necessity of hand lettering for the finished drawing. These originals are used to prepare a Van Dyke negative from which a number of white prints are made. The white prints of the graphic logs are returned to the production engineering department and the geological horizons are colored to more easily differentiate the particular zones. This information then becomes part of a book of graphic well records showing the various wells drilled in the field. This book is available to the field and office personnel of the production, geology and production engineering departments. In the event that any wells undergo additional completion changes, this data may be added to the original tracing, and additional white prints reproduced and colored for redistribution.

The graphic well records and supplementary typewritten records can form the basis for development, exploration and other continuous problems. They are a record in picture form of costly previous experience, and can be as valuable as they are accurate and comprehensive. Substantially they represent the advantages of a combined graphic assimilation and compilation of completion data, core analyses, and formation characteristics. The uses of these records can be numerous and varied. By referring to these well records it is possible in the case of offset wells to have a clear conception of the problems relative to successful well completions.

As succeeding wells are drilled, one adjacent to the other, it is possible to properly place the individual graphic records in their relative horizontal and vertical positions and form a cross section in any direction in which wells have been drilled. This is a very convenient and simple plan of conveying a true impression of relative depths, thickness and sequence of formations, formation changes, etc. Where it is necessary to prepare detailed cross sections throughout the field, these emergency cross sections may be utilized in defining the direction and location of such detailed cross sections, and hence allow for a more accurate and thorough picture of formation conditions and reservoir changes and extent.

The use of these graphic records can be an important aid to production practice. Formation characteristics necessarily indicate the producing characteristics of a well. Any preliminary preparations necessary for bottom-hole pressure tests, flow tests, bottom-hole chokes or other subsurface installations may be referred to the graphic inventory of the equipment. In the event that it is desired to begin preparations for work-over jobs these graphic records furnish a complete picture of the numerous and varied problems involved in running additional casing or tubing strings, cutting liners, plugging back, squeeze jobs for water and gas shutoff, perforating, acidizing, etc.

Where secondary recovery methods can be applied, these graphic records are valuable in representing core determinations as to porosity, permeability, etc.[5] The proper selection of key wells, injection methods, reservoir characteristics and the like could be facilitated with a complete picture of subsurface conditions. Besides the work of drilling and production, well records are a necessary basis for investigations relative to increased investments in proven fields. These investigations as to estimating reserves for the purpose of evaluation studies are contingent upon a thorough knowledge and understanding of the extent and characteristics of the producing formation. The degree with which a producing company is familiar with this data is an index to their capacity and ability to operate as a successful producer. The estimation of reserves can be a simple procedure when fundamentals are accurately determined. These determinations must have their origin in, and be substantiated by well records, core analyses,[3,5,6] and the other studies. Graphic records may specifically be utilized for an individual study of the drainage area surrounding the well. Where the permeability and porosity of a formation varies considerably the estimation of the effective producing section is indigenous to accurate and proper valuation procedure.

Besides the benefits which may be accrued from these records in drilling and completion work they serve as an effective medium in correlating the work of the geology department with that of the production department. All successful oil field development is the result of complete cooperation of these two departments, and any geology work which is not carried over into a consideration of the producing characteristics of a well will revert to a level of purely explorational study. In the same manner the production of wells is primarily contingent upon the characteristics of the producing formation and the manner of well completion, and any production department which fails to realize the necessity of considering geologic data in field development will jeopardize the gain to be had from sound experience in drilling and explorational activity.

It is not to be inferred from this discussion that the graphic well record as previously described and shown in Figure 1 is considered as the most effective and complete method of recording well data. The attendant advantages ascribed to the use of graphic well records is not restricted to any particular form, but rather may be referred to any convenient and advantageous means of presenting essential and representative facts relative to geology, drilling, and production information. Well records must necessarily undergo considerable changes in development and adaptation in order to be particularly applicable to various fields and specific conditions within the field.

In conclusion, the proper preparation of all well records is so essentially an item of fundamental importance that its relative value when fully realized by the petroleum industry will be greatly enhanced. No doubt there will be considerably more progress shown in compiling records, and this information will become so indispensable that it will of a necessity require the strict attention of engineers familiar with well problems. This function has in some areas become an important part of the work of the petroleum engineers, who realize a responsibility to the executives of the industry to simply and effectively prepare information which may be quickly assimilated and utilized for more profitable drilling and production practice.

TABLE 1—SUPPLEMENTARY RECORD OF CORES FROM "NO. 1 J. W. SMITH"

Sample No.	Formation description—	Depth	Sub-sea depth	Per cent Porosity	Per cent Saturation	Permeability Horiz.	Permeability Vert.	Mg./CC salt
1	Hard Coq. Ool. lime	5,930	5,710	16.0	0.0	11	9	0 57
2	Hard Coq. Ool. lime	5,932	5,712	13.2	0.3	52	1	3 16
3	Hard Foss. Ool. lime	5,934	5,714	12.5	0.0	0	0	10 14
4	Hard lime and shale	5,936	5,716	8.1	0.5	0	0	7 29
5	Hard lime and shale	5,938	5,718	7.9	2.1	0	0	5 20
6	Hard Foss. lime with shells	5,940	5,720	8.4	1.6	18	4	3 79
7	Hard Foss. lime with shells	5,942	5,722	12.7	2.0	0	0	8 48
8	Foss. shale with lime streaks	5,944	5,724					
9	Soft mealy Ool. lime	5,946	5,726	11.2	4.8	310	393	0 56
10	Soft mealy Ool. lime	5,950	5,730	16.0	19.3	102	427	0 69
11	Hard mealy Ool. lime	5,952	5,732	11.0	3.9	52	127	0 34
12	Hard mealy Ool. lime	5,954	5,734	16.0	1.2	139	198	0 27
13	Soft mealy Ool. lime	5,956	5,736	18.2	16.7	490	217	0 38
14	Soft mealy Ool. lime	5,958	5,738	20.5	29.0	482	525	0 86
15	Soft mealy Ool. lime	5,960	5,740	16.2	20.7	378	305	0 70
16	Hard mealy Ool. lime	5,962	5,742	8.9	18.9	205	110	0 60
17	Soft mealy Ool. lime	5,964	5,744	14.1	23.1	190	180	0 69
18	Soft mealy Ool. lime	5,966	5,746	16.5	27.8	285	310	0 83
19	Soft mealy Ool. lime	5,968	5,748	17.2	31.4	392	350	0 91
20	Soft mealy Ool. lime	5,970	5,750	18.3	26.3	468	625	0 70
21	Soft mealy Ool. lime	5,972	5,752	19.4	29.7	590	680	0 59
22	Soft mealy Ool. lime	5,974	5,754	24.1	34.9	858	834	0 87
23	Soft mealy Ool. lime	5,980	5,760	20.0	26.8	723	683	1 13
24	Soft mealy Ool. lime	5,985	5,765	18.5	32.3	545	600	1 32
25	Hard finely Ool. lime	5,987	5,767	14.1	18.2	415	360	0 98
26	Hard finely Ool. lime	5,989	5,769	10.2	20.7	135	192	0 68
27	Hard finely Ool. lime	5,991	5,771	12.0	12.3	180	157	0 71
28	Hard finely Ool. lime	5,993	5,773	11.6	6.7	155	118	0 82

CORING DATA

Core No.	Depth From	Depth To	Sub-sea From	Sub-sea To	Cored (ft.)	Rec.	Pct. rec.
1	5,930	5,950	—5,710	—5,730	20	17.5	88
2	5,950	5,970	—5,730	—5,750	20	18.0	90
3	5,970	5,985	—5,750	—5,765	15	13.0	87
4	5,985	6,001	—5,765	—5,780	15	12.5	83
Average recovery (per cent)							87

FORMATION AND CASING DATA

Description—	Depth	Sub-sea
Top of Dees	5,895	—5,675
Top of Upper Young	5,928	—5,708
Top of Lower Young	5,947	—5,727
Top of saturation	5,947	—5,727
7-inch casing at	5,963	—5,743
Total depth	6,000	—5,780

Acknowledgments

The writer gratefully acknowledges permission from the Arkansas Fuel Oil Co. to publish this article and wishes to accredit the production engineering department for the development of this graphic record scheme. Any opinions expressed, interpretations made, and data or reproductions shown should not be inferred or construed as official with the company, but are the sole responsibility of the writer.

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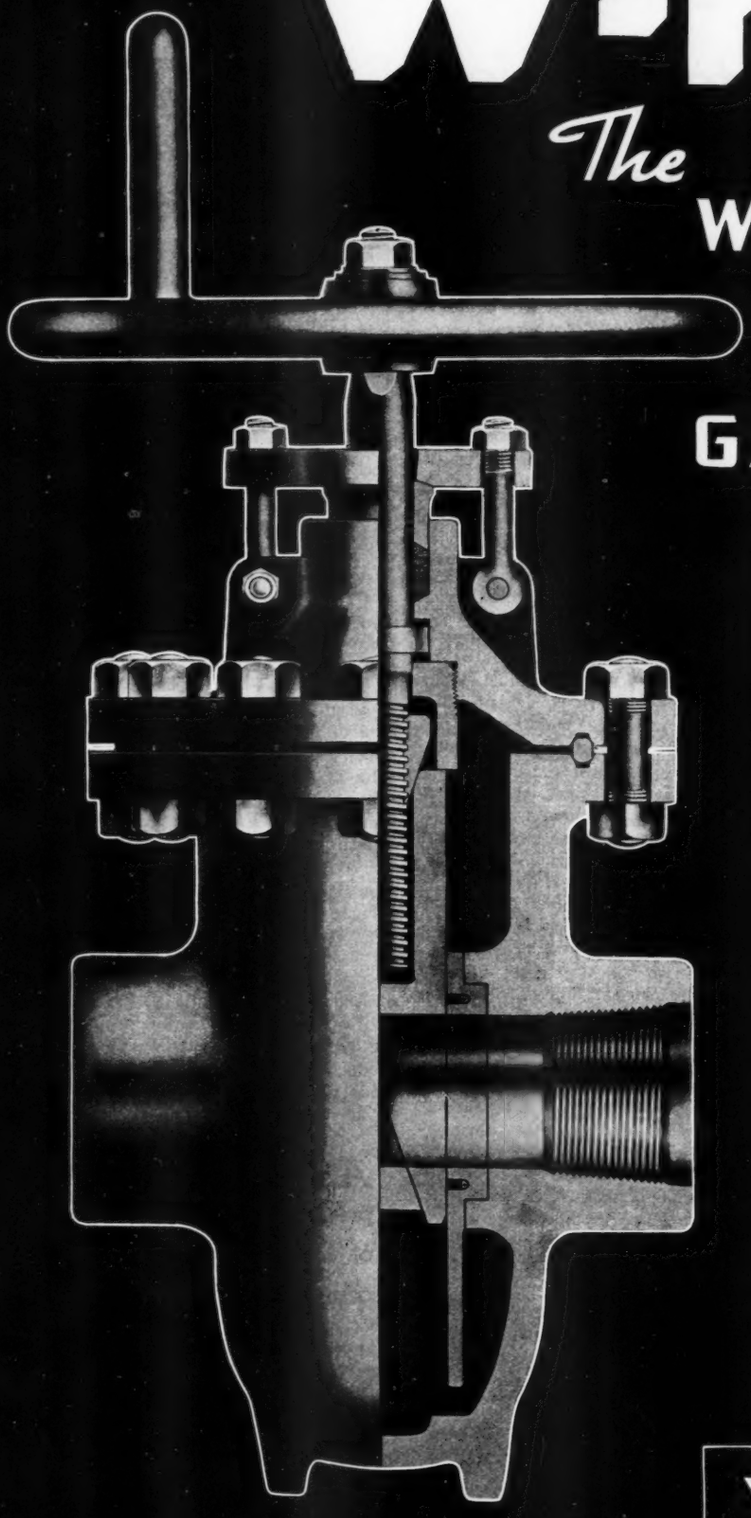

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Determining Productivity of Reservoirs by Bottom-Hole Pressure and Core Analysis

By W. S. WALLS
Phillips Petroleum Co.*

The determination of the productivity of wells from subsurface pressure and production data has attracted considerable attention from engineers and operators of oil properties during the last decade. Numerous articles have been written on the various phases of the subject and considerable useful field data have been accumulated.

Productivity data are useful for determining the most satisfactory operating conditions for individual wells and have been recognized as one of the factors for consideration in the allocation of production. The productivity characteristics of a given reservoir may be advantageously used as a factor in well spacing problems, to obtain efficient operating conditions for wells and economical well spacing. The most important practical application of the measurements is found in the possible substitution of productivity data, as determined from subsurface pressures and production data obtained at relatively low rates of flow, for the open-flow potential tests. Open-flow potential tests as well as pumping potential tests, in which subsurface pressures are disregarded, may not be a true indication of the production capacity of the formation, since such tests are dependent upon the capacity and efficiency of the equipment employed in producing the oil. The use of subsurface pressure and production data for determining potentials make it possible to obtain a more direct measure of the ability of the formation to produce oil and makes unnecessary the use of oversized equipment and excessive tankage facilities, which permits considerable saving in equipment costs. The premature and uneven water encroachment, which sometimes results from the large reduction in bottom-hole pressure obtained while flowing at high rates of production during open-flow potential tests, may also be avoided.

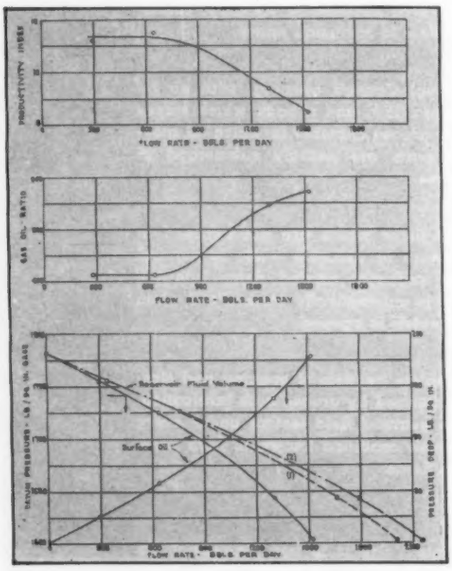
PRODUCTIVITY INDEX
FLOW RATE - BBLS. PER DAY
GAS OIL RATIO
FLOW RATE - BBLS. PER DAY
Reservoir Fluid Volume
Surface Oil
FLOW RATE - BBLS. PER DAY

Fig. 1—Flow characteristics of Well A

General application of productivity data to production practice has been delayed due to uncertainty as to whether the data were consistent enough to serve for the classification of wells and for the allocation of production. A number of factors have contributed to this uncertainty. Field data have not proven entirely consistent with respect to rate of production. The flow of oil, gas, and water mixtures through reservoir formations is not thoroughly understood. The permeability characteristics of the strata composing a given formation and the characteristics of the fluid contents of the reservoir, as well as their segregation within the various strata, have been observed to vary appreciably. Variations in the amount of the productive formation penetrated by wells and variations in well completion practices have been observed to influence productivity data. Requirements with regard to operating conditions, care, time, and special equipment needed for properly conducting well performance tests have also contributed to the delay in practical application of the data to field practice.

Due to the numerous articles which have been written on the theoretical and practical aspects of productivity measurements and on the flow of homogeneous and heterogeneous fluids through porous media, this discussion will be largely a review of certain phases of these related subjects. The discussion will include the more general features of the practical application of productivity measurements from subsurface pressure and production data for flowing and pumping wells, the common sources of errors in measurement, and factors affecting the validity of the measurements. Some of the more general features of productivity determinations or correlations from core analysis as applied to primary and secondary operations will be mentioned.

Literature

T. V. Moore[1] suggested the use of measurements of the static subsurface pressure and of flowing subsurface pressures at various rates of production as a means of estimating relative capacities of wells without taking open-flow potentials. This relation is expressed as the "productivity index," and is defined as the barrels per day of gross liquid produced per pound per square inch pressure drop at a specified subsurface datum, preferably referred to the mean pressure at the sand face. These data, together with well diameter and penetration, have been used by

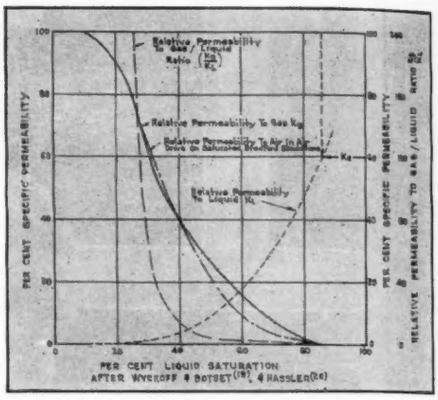
PER CENT SPECIFIC PERMEABILITY
Relative Permeability to Gas / Liquid Ratio
Relative Permeability To Gas Kg
Relative Permeability To Air In Gas Drive In Saturated Wetted Sand
Ka
Relative Permeability to Liquid Kl
PER CENT SPECIFIC PERMEABILITY
RELATIVE PERMEABILITY TO GAS / LIQUID RATIO
PER CENT LIQUID SATURATION
AFTER WYCKOFF & BOTSET[18], & HASSLER[24]

Fig. 2—Generalized permeability-saturation relation for gas-liquid steady state flow through unconsolidated sands

Moore, Schilthuis, and Hurst[2] to calculate the effective permeability of the sand. The application of the productivity index to proration methods has been studied by the Institute's committee on allocation[3].

M. L. Haider[4] has discussed the determination of productivity indices and has presented the data obtained from a number of wells in Oklahoma. Kemler and Poole[5] have presented the results of a preliminary investigation of flowing wells in the West Texas area and have discussed the applications and significance of the data obtained. Miller, Burnett, and Higgins[6] have discussed some results obtained in a Bureau of Mines study of certain data pertaining to subsurface pressures and production of wells producing oil and gas (and water). For 45 wells flowing naturally under volumetric or hydraulic control, a linear relation was observed between the mass rate of fluid (oil, gas and water) production and the corresponding drop in pressure in the reservoir sand. Expressing the total fluid production in terms of mass units frequently tends to give more nearly a linear relationship for the "draw-down curves." The straight-line relationship appeared to apply reasonably well to the viscous flow of undersaturated crude oil through reservoir sands in the East Texas field studied by Reistle and Hayes[7].

Muskat[8] developed a relationship for determining production capacity and reservoir pressure from pressure build-up data and rise of fluid level in pumping wells. The determination of reservoir pressures from build-up data was checked by Kemler and Poole[5] in their investigation of flowing wells. The determination of production capacity in pumping wells also has been discussed by Katz and Barlow[9].

A compilation of terms used in oil-well performance measurements and calculations has been developed and discussed by Kantzer and Trostel[10]. The adoption of a standard set of definitions and symbols for designating oil-well performance data

A.P.I. — First-half of paper presented before spring meeting of Division of Production, Amarillo, Tex., February 17-18, 1938

*Paper presented under author's title of "Practical Methods of Determining Productivity in Reservoirs on Leases by Bottom-Hole Pressure and Core Analysis."

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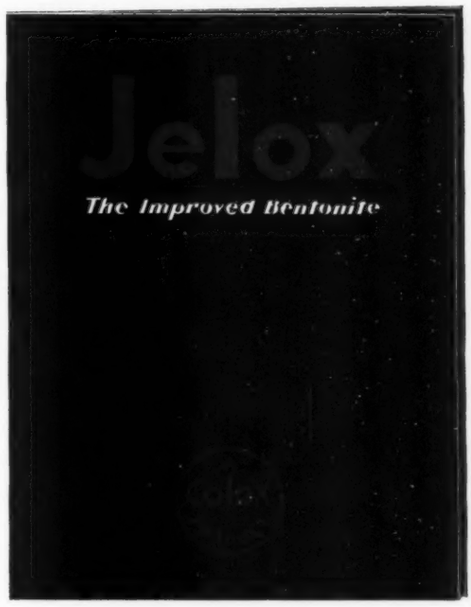

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will do much to clarify the confusion that has existed regarding the data and their application.

A number of important articles dealing with the flow of homogeneous and heterogeneous fluids through porous media have been published by Muskat, Wychoff, and coworkers.[11, 12, 13, 14, 15, 16] A number of other articles dealing with certain phases of the subject are included in the bibliography.[17, 18]

Productivity Measurements in Flowing Wells

Productivity measurements in flowing wells involve subsurface measurements of a static or equilibrium shut-in pressure-depth traverse, flowing datum pressures at steady rates of fluid production, perhaps a flowing pressure-depth traverse or flowing pressure gradients, and subsurface temperatures. Surface measurements include tubing and casing pressures, gas production rate, oil or liquid production rate, and separator pressures and temperatures. Pressure build-up measurements may be included for purposes of checking the static reservoir pressure and determining the shut-in period necessary for establishing equilibrium conditions.

The *static subsurface pressure* is measured after the well has been shut in for a sufficient period of time to allow the pressure at the sand face to build up to the pressure in the surrounding reservoir. A recording subsurface pressure gauge[17, 18, 19, 20, 21, 22] is lowered into the well and the pressures recorded at various depths. A plot of the observed pressure versus depth permits the location of oil and water levels of the fluids that may be standing in the tubing or well, and provides pressure gradients for calculating the static pressure to the desired datum level in case it is inconvenient to measure the pressure at the datum level directly. In order to avoid confusion it is absolutely necessary that the datum level be specified for all subsurface pressure sand temperatures. The point from which the depth measurements are taken should be specified and the relation of this point to some standard point for which the elevation is known recorded. The depth below the derrick floor and the subsea elevation have been suggested as standard reference points. When the rate of pressure build-up in a well has not been measured to definitely establish that pressure equilibrium exists in the well after a given shut-in time, it is desirable to report the shut-in time and the operating conditions prior to the shut-in period. The reason for recording these data arises from the fact that the build-up periods of wells vary and while some wells may build up to reservoir pressure in an hour, others may require a number of days. The recording of all pertinent information concerning the subsurface pressures observed during productivity tests will make it possible to use the data for other reservoir engineering studies, such as the estimation of reserves and the rate of water encroachment in reservoirs.

Kantzer and Trostel[18] have suggested the use of the symbol, P_d, for representing the static or equilibrium shut-in pressure in pounds per square inch gauge existing at the datum depth d, and $P_{d,t}$, for representing the nonequilibrium pressure after the well has been shut in for t hours.

It is obvious that accuracy is desired in all measurements. The subsurface pressure gauge is a delicate instrument and must receive an unusual amount of respect in handling and operation if reliable results are to be obtained. Several makes of recording subsurface pressure gauges[17, 18, 19, 20] are now available and manufacturers[17, 19] usually supply instructions concerning the operation and care of the instruments. All instruments should be maintained in good condition, carefully calibrated (and frequently checked) against a reliable dead-weight tester over the pressure and temperature ranges to be encountered in conducting measurements, and operated properly if accurate results are to be obtained.

TABLE 1—FLOW CHARACTERISTICS OF WELL A

Order of tests	Depth, feet below D.F.	Pressure lb./sq. in.	Hours of flow	Flow rate bbls. per day	Gas-oil ratio*	Tubing pressure lb./sq. in.	Productivity index
1	5,122	1,785	..	0	...	1,025	...
4	5,120	1,781	..	0	...	910	...
5	5,120	1,755	3	290	411	430	11.2
2	5,120	1,725	4.5	643	411	540	11.3
3	5,120	1,643	1.4	1,298	547	630	9.4
6	5,120	1,602	2	1,524	571	640	8.5

*Gas-oil ratio calculated from separator gas and stock tank liquid with separator operating at 25 pounds gauge and 60° F. Productivity index = barrels per day per pound drop in datum pressure. Solution gas-oil ratio for separator conditions = 470. Gravity of separator conditions = 0.88. Gravity of stock tank oil = 41.7° A.P.I. Gas solubility at 116° F. and 1,780-pound gauge = 655 cubic feet per barrel of residual oil at 60° F. Gas solubility at 78° F. and 1,780-pound gauge = 550 cubic feet per barrel of residual oil at 60° F. Estimated gas solubility at 60° F. and 1,780-pound gauge = 490 cubic feet per barrel of residual oil at 60° F. Per cent shrinkage of reservoir oil at 60° F. and 1,780-pound gauge = 20 per cent based on residual oil at 60° F. No water production during tests.

TABLE 2—CALCULATIONS OF RESERVOIR VOLUME OF FLUID PRODUCTION

Datum pressure lb./sq. in. Abs.	Flow rate bbls. per day residual oil	Mean pressure Pm lb./sq. in. Abs.	Volume of 1 bbl. residual crude at Pm	Volume of 1 bbl. residual oil + gas at Pm (1)	Volume of 1 bbl. residual oil + gas at Pm (2)	Reservoir fluid flow rate bbl. per day (1)	Reservoir fluid flow rate bbl. per day (2)
1,796	0	1,796	1.20	1.20	1.20	0	0
1,770	290	1,783	1.198	1.198	1.198	347	347
1,740	643	1,768	1.196	1.196	1.196	769	769
1,658	1,298	1,727	1.194	1.288	1.384	1,672	1,796
1,617	1,524	1,702	1.193	1.322	1.418	2,015	2,161

Mean Pressure, $Pm = \frac{P_a + P_b, R}{2}$

(1) Assuming that solution gas-oil ratio is 490 and that 20 cubic feet of gas per barrel of residual oil was lost from separator to stock tank. (2) Assuming that solution gas-oil ratio is equal to observed gas-oil ratio for low flow rates and that all gas-oil ratio observations were too low by a constant factor. The assumption is made that all of the gas above solution gas-oil ratio was being produced from the oil producing zones.

After the static pressure measurements have been completed, the well is opened and the flowing pressures observed. When the well is allowed to produce, the pressure in the well bore declines and a pressure gradient is established between the reservoir and the well bore. The pressure gradient permits expansion of the reservoir fluids in the vicinity of the well bore and promotes movement of the fluids into the well. Studies of the flow of homogeneous[11, 12, 15, 16] and certain heterogeneous fluids[11, 12, 14] through porous media have indicated that rather definite relations exist for the distribution of pressure within the reservoir in the vicinity of the well, during steady state or equilibrium flow conditions. The rate of attainment of this equilibrium condition of flow varies with the effective permeability of the strata composing the formation. For highly permeable strata equilibrium flow conditions may be attained in an hour or so, while strata having very low permeability may require a much longer period. Formations composed of strata having a wide range in effective permeability, may have equilibrium flow conditions existing in the strata of high permeability while those of low permeability are still in the transient stages. For practical purposes, however, measurements are usually taken as soon as the rate of flow and flowing pressure have become approximately constant.

While the measurement of productivity indices requires only the static pressure, and flowing pressures at definite rates of flow to be taken at a given datum level, the observing of other data such as the tubing and casing pressures, and flowing pressure gradients are useful in correlating well performance and predicting the life of flowing wells.

Flowing pressure gradients are needed to correct the flowing pressures observed at a given depth, in terms of the desired datum level when measurements cannot be conveniently measured at the desired depth. The passage of the gauge through the tubing has been observed to cause some disturbance in equilibrium flow conditions especially in small diameter tubing at fairly high rates of flow. It would be desirable to measure flowing pressures with the gauge below the tubing, or below the perforations in the tubing when safe and convenient. The lowering of the gauge below the tubing increases the hazard of losing the gauge in the well and discretion is necessary in such matters. A gauge with outside diameter of 1¼ inches has been observed under ordinary circumstances to cause only a very small effect in 2½-inch tubing at rates of flow of less than 50 bbls. per hour. A constant tubing and casing pressure while flowing at a constant rate usually indicates that the flowing subsurface pressure is constant and that the well is in a suitable condition for the recording of flowing subsurface pressures and the rate of gas and liquid production. The separator should be operated at a constant pressure of about 20 pounds or less, in order that uniform separation and shrinkage will occur. This is particularly important if solubility and shrinkage data obtained from the examination of bottom-hole samples of reservoir fluids are to be used for the estimation of the actual volumes of liquid and gas flowing through the formation under a given set of reservoir conditions.[17, 23]

Gauging Production

The gauging of the liquid and gas production rate for the flowing pressure requires considerable care if accurate production rates are to be determined. The production rate must be observed for an interval while the rate of production is steady and equilibrium flow conditions exist. At low rates of production, where the oil is collected in a fair sized separator, the change in liquid level in the separator during the test period may be so small that the errors in reading the levels may produce a substantial error in the rate measurement. The errors in measuring the gas production may be large unless suitable equipment is used for the purpose. The separator temperature and pressure must be recorded. The reporting of accurate gas-oil ratios and water-oil ratios for the production furnishes useful information concerning well operation. The variation in gas-oil ratio with production rate and the control of gas-oil ratios have recently been discussed by Sullivan.[25]

The observing of casing and tubing pressures permits the accumulation of data which indicate the flowing life of the well, and permit the correlation of gas-oil ratio with the pressure drop in the tubing flow. In recording tubing and casing pressures ,it is well to know the accuracy of the gauge used.

Reistle[24] has reported the variation in temperature at various depths in 2½-inch tubing in an average East Texas well for various rates of production. With the oil originally at a temperature of 150° F. at 3,565 feet, it was reported that the temperature was 104° F. at the surface for 100 bbls. per hour flow rate as compared to 67° F.

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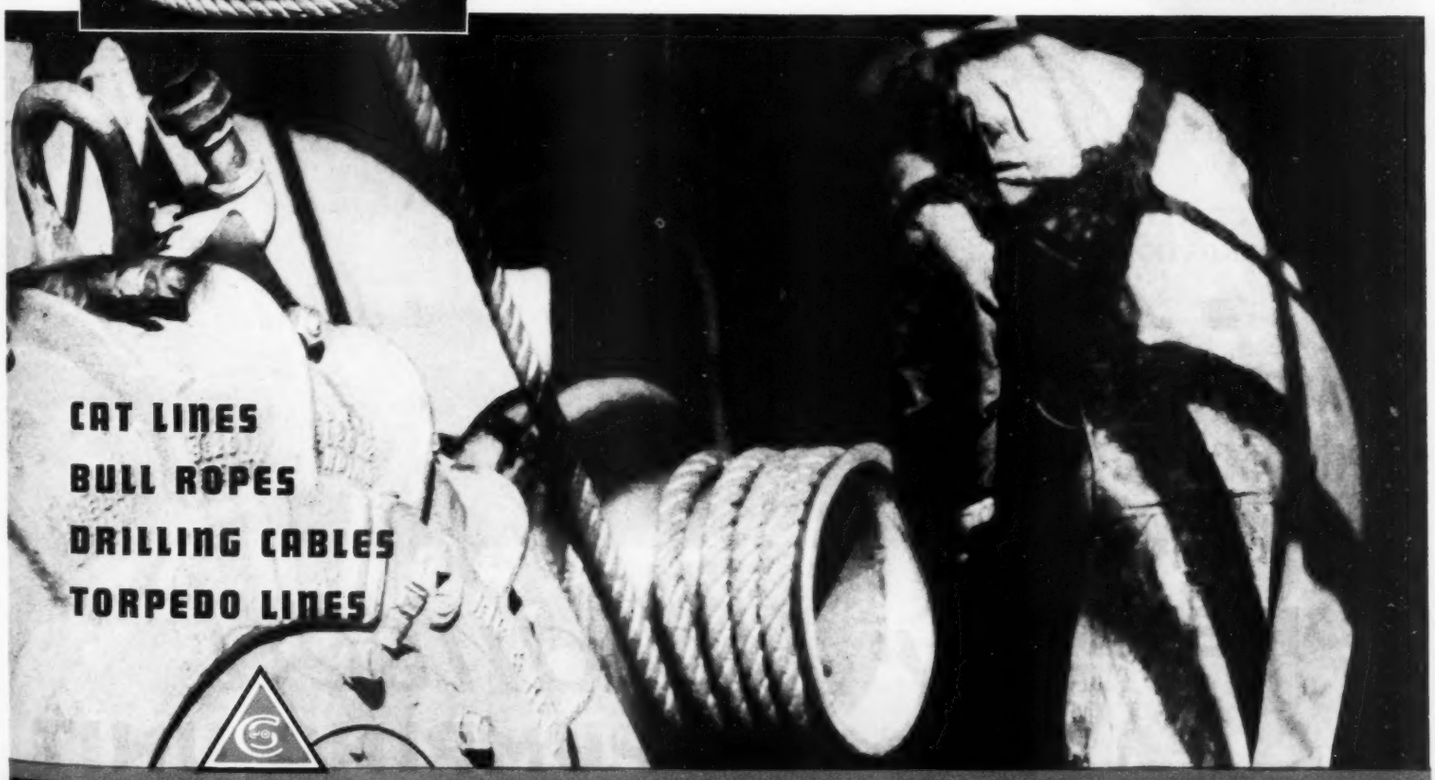

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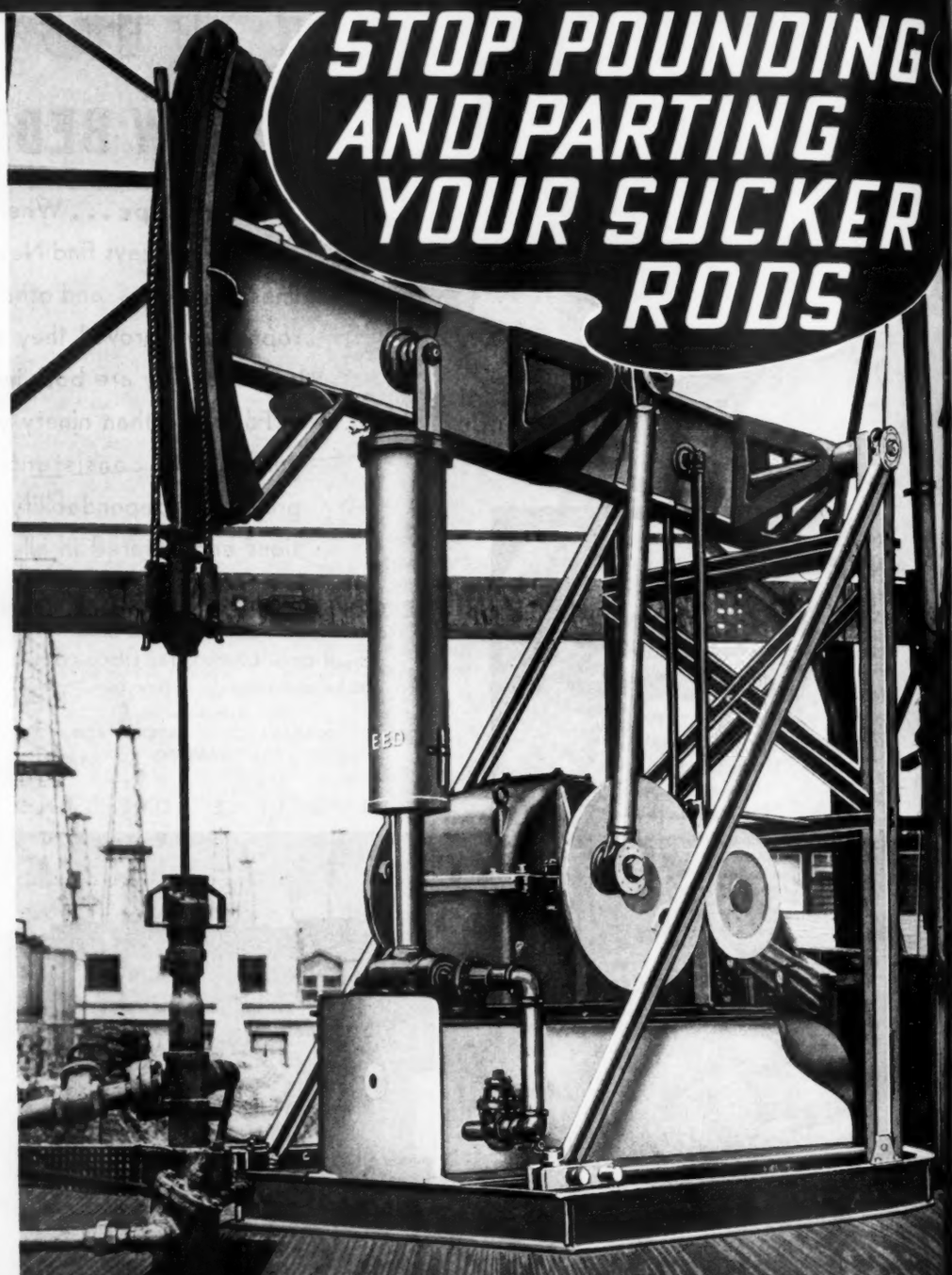

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for the shut-in surface temperature. For small changes in flow rate the variations in separator temperatures probably would be small.

Pertinent information on tubing depth, casing depth, formation depth, penetration of the well, and well completion methods employed should also be recorded.

The producing pressure[10] may be conveniently represented by the symbol P_dR, which is the pressure at depth d when the production rate is R gross barrels per day. The data may be conveniently plotted in the form of a draw-down curve in which the observed static and flowing datum pressures are plotted against the production rate. When the production rate is expressed in gross barrels per day the curve has been termed a gross liquid draw-down curve. When the production (oil, gas, and water) is expressed in terms of mass units such as pounds per day the curve has been termed a mass draw-down curve. For the viscous flow of homogeneous fluids the draw-down curves should be linear. While deviations from linearity are encountered in some cases a large number of wells have been found to give substantially straight-line curves. The conditions favoring the linear relation will be discussed further, later.

The data may also be plotted in the form of the pressure drop versus production rate. In this case the curve passes through the origin and in many cases is substantially linear.

Productivity Index

The "productivity index" has been defined as the barrels per day of gross liquid produced per pound per square inch pressure drop at a specified subsurface datum. When the production is expressed in mass units the relation is termed the mass productivity index. If the draw-down curve is linear the productivity index is a constant over the range in which the curve is linear. There are theoretical reasons why one should not expect all wells to have a constant productivity index under all conditions of flow and deviations are to be expected. However, it is likely that a large majority of wells will have reliable productivity indices provided favorable conditions are chosen for tests.

An example of well performance measurements in which the productivity index was not constant with the rate of production is shown in Figure 1. This well, designated as well A, may be described as follows: Surface elevation 1,013 feet; derrick floor elevation 1,017 feet; total depth 5,129 feet from derrick floor; 7-inch casing set at 5,026 feet; and 2½-inch tubing set at 5,107 feet. The top of a sandy oil-producing zone is at 5,098 feet and several calcareous zones of low permeability bearing oil and gas are exposed from 5,026 to 5,098 feet. The permeability characteristics of the formation vary considerably. Acidizing the calcareous zones with 3,000 gallons of acid increased the rate of flow from 30 to 140 bbls. per hour.

The results of flow tests are shown in Table 1 and in Figure 1. Solubility and shrinkage data, which will be referred to in the discussion are included in Table 1. The subsurface pressures were observed below the tubing at 5,120 feet (derrick floor) or 4,103 feet subsea. The static pressure observed 18 hours after shut in was 1,785 pounds, and 14 hours after shut in following flow at 1,298 bbls. per day was 1,781 pounds. A pressure built-up test (not shown in the table) indicated build-up from 1,602 to 1,742 pounds in 50 minutes. The static temperature was 116° F. at 5,120 feet.

The draw-down curve is linear for flows up to 643 bbls. per day, but falls off at high rates of flow. The gas-oil ratio is approximately constant while the draw-down curve is linear, but increases sharply at high rates of production. The gas-oil ratio shown is calculated from the separator gas and the stock tank liquid with the separator operating at 25 pounds per square inch gauge and 60° F. The gas-oil ratio observed in this manner is not correct, but is too low by the amount of gas that was evolved from the separator liquid while passing from the separator operating at 25 pounds per square inch gauge and 60° F. to atmospheric pressure in the stock tank. While the gas evolved between 25 pounds per square inch gauge and atmospheric pressure can be readily calculated[25] other possible losses from the stock tank must be estimated. The solution gas-oil ratio for the reservoir fluid at 60° F. is about 470 under separator conditions and from 490 to 500 under stock tank conditions (exclusive of weathering). The observed gas-oil ratio is from 20 to 30 cubic feet per barrel too low and is lower than the solution gas-oil ratio by about 10 or 12 per cent. Several possible explanations might be advanced to explain this circumstance: (1) The low gas-oil ratios may be due to errors in measurement, (2) steady state conditions of flow and equilibrium saturation of the oil may not have been entirely realized. The second possibility may result from undersaturating of reservoir crude in the oil-bearing formation in the vicinity of the producing well due to previous flowing of the well at high rates of flow with gas-oil ratios higher than solution gas-oil ratio. The 290 bbls. per day flow test was taken 14 hours after shut-in following the 1,298-bbl. per day flow test, which had a gas-oil ratio higher than solution gas-oil ratio. It is felt that the observed difference is within the errors in measurement, but the second possibility mentioned may also contribute. The rapid rate of pressure build-up would indicate that the more productive strata were probably producing under or approaching steady state conditions.

The increase in gas-oil ratio to above solution gas-oil ratio at the high rates of production indicates that excess gas was being produced from the formation, which in view of laboratory investigations on the flow of heterogeneous fluids through porous media[13, 14] may be responsible for the observed decrease in the rate of liquid production per pound of pressure drop. The gas-oil ratio was observed to increase to about 725 during an open-flow potential test when the well flowed at the rate of 3,376 bbls. per day.

The volume of the liquid as measured on the surface does not represent the actual volume of fluids that are flowing through the pores of the formation.[25] The shrinkage of the reservoir liquid at 60° F. and 1,780 pounds per square inch gauge based on residual oil at 60° F. is about 20 per cent. This means that the observed volume of oil should be multiplied by 1.2 to obtain the volume of the liquid actually flowing through the formation when the pressure is 1,780 pounds. As the pressure in the reservoir is decreased gas will come out of solution and the volume of the liquid in the formation based on residual oil at the surface will be decreased.

Reservoir Volume

Table 2 shows some calculations of the reservoir volume of the fluid production as estimated from solubility and shrinkage curves. The calculations serve to illustrate the manner in which the volume of reservoir fluids may be estimated and to show, under conditions when gas and oil may be flowing in the formation, that the volume of the reservoir fluids actually passing through the pores may be considerably larger than the volume of the oil observed on the surface. In cases where the gas-oil ratio increases at high rates of flow to above solution gas-oil ratio and the productivity index decreases, expression of fluid production in terms of volume under reservoir conditions will tend to cause the draw-down curves to more nearly approach a linear relation.

Based on theoretical and laboratory investigations[11, 14, 26] one would not expect the productivity index to be a constant under all circumstances. For homogeneous fluids the productivity index would be expected to be a constant for all rates of flow in which the flow was viscous. A departure from viscous to turbulent flow would be expected to cause deviations; however, it has been observed that very high pressure gradients are required to obtain turbulent flow in the flow of homogeneous fluids through porous sandstones. Such pressure gradients could only be obtained in the vicinity of the well bore and under very high rates of flow.

Flow Through Unconsolidated Sands

The flow of gas-liquid mixtures through unconsolidated sands has been investigated by Wyckoff and Botset.[13] They reported a relation between permeability and liquid saturation of the sand which permits the correlation of saturation and the steady-state flow of gas and liquid components. In Figure 2, their results are used to show a generalized permeability-saturation relation for gas-liquid steady state flow through unconsolidated sands. Their data for the flow of water and carbon dioxide gas through unconsolidated sands having a range in permeability from 17.8 to 262 darcys, show a scattering of about ±5 units from the curves shown in Figure 2.

The specific permeability K_s is the permeability of the porous medium for a homogeneous fluid and is expressed as darcys. This means in the case of the tube having permeability of 17.8 darcys, that for a pressure gradient of one atmosphere per centimeter, 17.8 cc. of water of 1 centipoise viscosity will flow through each square centimeter cross section of sand per second. On the other hand, if carbon dioxide gas having a viscosity of 0.015 centipoise is the fluid, its volume rate of flow at the mean pressure in the sand with a pressure gradient of 1 atmospheric per centimeter will be 17.8/0.015 = 1,186 cc. per second. In Figure 2, the variation in observed permeability to the gas component of the mixture K_g and to the liquid component of the mixture K_l is presented in the form of per cent specific permeability for each component as a function of per cent liquid saturation. In order to clarify the meaning of the terms used, let us consider the point (Figure 2) at 59 per cent liquid saturation, at which the relative permeabilities to gas and to liquid are both equal to 16 per cent of the specific permeability. At this point the relative permeability to gas/liquid ratio, K_g/K_l, is unity. Water will be flowing at the rate of 16 per cent of the specific permeability or at 2.85 cc. per second and CO_2 at the rate of 190 cc. per second through the 17.8 darcy sand when the pressure gradient of 1 atmosphere per centimeter is being applied. Under these conditions, the gas/liquid ratio of the gas and liquid flowing through the sand will be 67 when expressed in relative units. At this point, the total volume of gas and liquid passing through the sand will be more than 10 times as great as the volumetric capacity for water alone.

The relative permeability to gas/liquid ratio curve K_g/K_l, may be converted to the gas/liquid ratio, expressed in relative units, for the gas and liquid flowing through the sand by multiplying by the viscosity liquid/gas ratio. For the case of water and carbon dioxide, the viscosity liquid/gas ratio is approximately 1.0/0.015 or 67.

There are several features of the curves shown in Figure 2 that are worthy of attention. It is to be noted that at high liquid saturation only liquid will flow until the equilibrium permeability K_E is reached. At K_E steady state conditions of

(Continued on Page 72)

6

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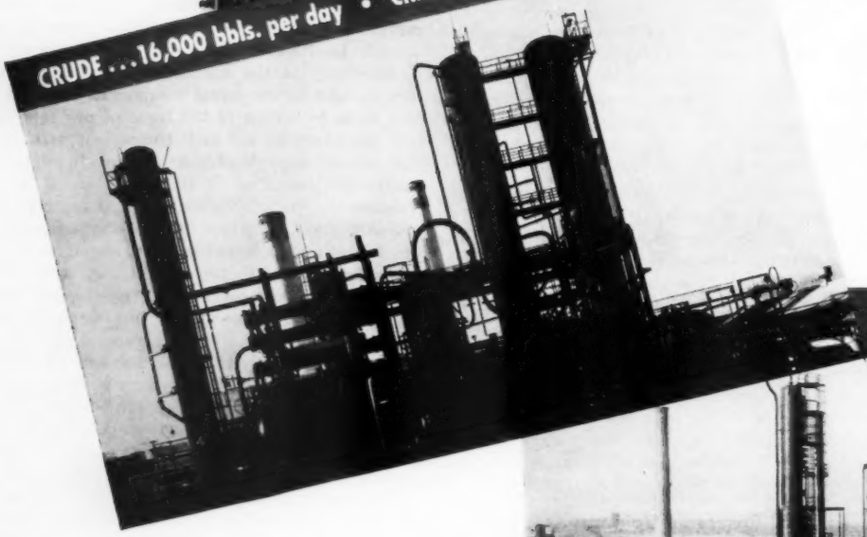

Lummus Combination Selective Cracking Unit, Smiths Bluff; designed to operate on Van Zandt, East Texas and Mixed Gulf crudes; consists of crude distillation, light and heavy gas oil cracking, reforming, visbreaking and high pressure gasoline stabilization. Capacity: 11,000 barrels per day producing high octane gasoline.

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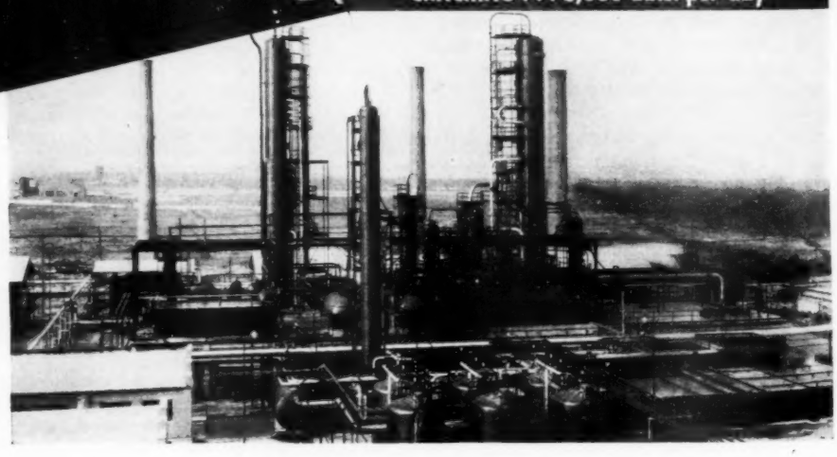
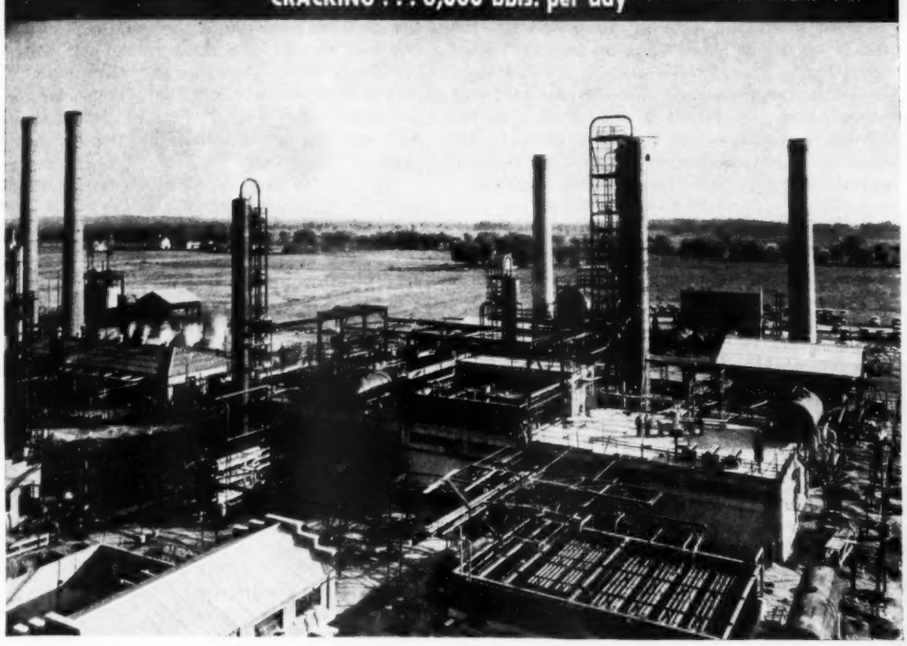


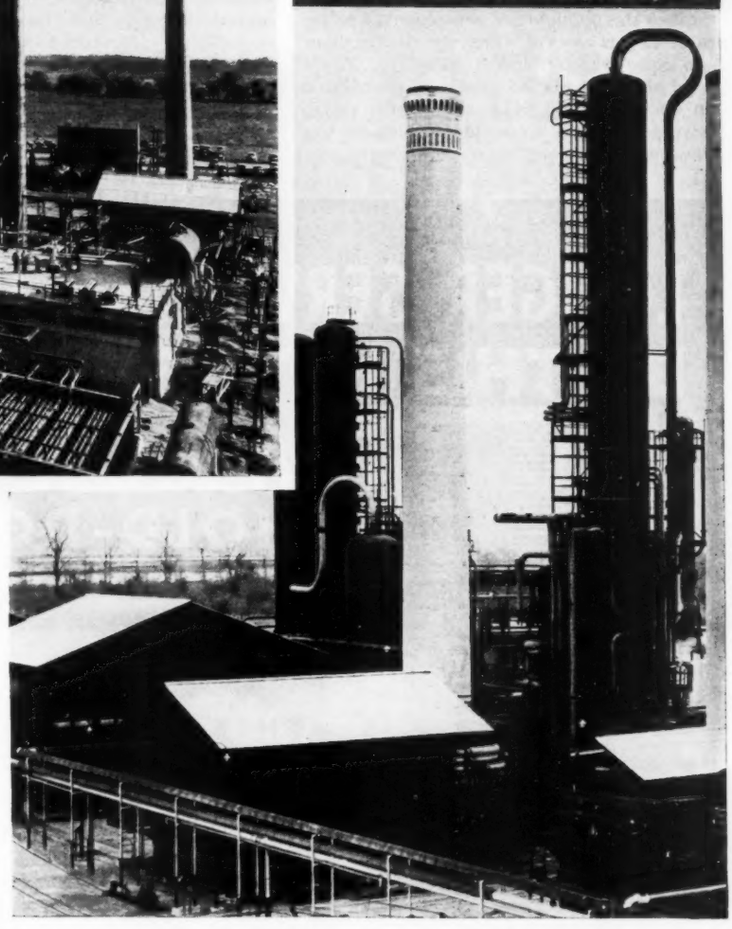
Lummus Combination Selective Cracking Unit, Toledo; similar to the first Lummus unit at this refinery, differing only in its ability to produce No. 1 and No. 3 Furnace Oils. Cracking capacity: 6,000 barrels per day.

CRACKING . . . 6,000 bbls. per day



Lummus Combination Selective Cracking Unit, Heath. This unit is running crude from the Pure Oil Company's new Illinois field, also Mid-Continent and Corning crudes. Cracking capacity: 6,000 barrels per day.

CRUDE . . . 11,000 bbls. per day



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flow can be attained. Above the point marked K_s, it is not possible to have steady state conditions. Various experiments have been made at widely different liquid velocities and with extremely small gas/liquid ratios, without changing the final steady state values for permeability and saturation. Since this steady state condition is a definite characteristic of a given sand and fluid system, it has been called "equilibrium permeability," and the liquid saturation of the sand corresponding to the equilibrium permeability has been called the "equilibrium saturation." The significance of this concept is that the first gas bubbles to come out of solution may lodge in the pores of the sand due to interfacial forces and Jamin effect and will cause a reduction in the effective permeability to liquid and prevent free gas flow until the equilibrium permeability and equilibrium saturation have been reached. Below this point both gas and liquid may flow under steady state or equilibrium conditions. The point of equilibrium permeability varies somewhat with different sands and different fluid systems, but usually occurs at about 80 to 90 per cent liquid saturation.

The rate of total fluid flow for the gas-liquid system shown in Figure 2 should start at the normal rate of flow for liquid at 100 per cent liquid saturation and then decrease as the saturation decreases until the point of equilibrium permeability is reached, after which the rate should increase gradually to about 35 per cent liquid saturation and then rapidly to about 10 to 15 per cent liquid saturation, where the rate of flow should approach that of gas through unsaturated sand. When the flow of liquid and gas is considered in terms of the sum of the per cent specific permeabilities, it is observed that a minimum is obtained at the point at which the curves cross. At this point, the effective permeability for the water-carbon dioxide system is only about one-third of the specific permeability. This circumstance arises from the fact that in the flow of heterogeneous fluids, that interfacial forces and phase conditions prevent the liquid and gas from flowing at rates in proportion to their respective viscosities.

The gas/oil ratio of the fluid moving through the sand increases gradually as the liquid saturation is decreased below the point of equilibrium saturation, until a saturation of from 30 to 40 per cent is reached. From this point the gas/oil ratio increases very rapidly until at liquid saturation of about 10 to 15 per cent, practically no further liquid can be produced, and the permeability of the sand to gas is about the same as for zero liquid saturation.

While laboratory investigations of the flow of oil, gas, and water systems through consolidated and unconsolidated sands have indicated that the spread of the data for the various systems may be greater than the ± 5 units indicated for the water-carbon dioxide system shown in Figure 2, the majority of investigations have indicated that in spite of other variables influencing the results, there are rather definite trends to the data and significant principles are involved.

There are several significant circumstances regarding productivity indices that are suggested from the above discussion and the data shown in Figure 2. For steady state flow in oil-bearing strata (exclusive of gas-bearing strata) at constant gas-oil ratio, the effective permeability and effective liquid saturation of the reservoir should be constant, and one would expect the productivity index to be constant for various rates of liquid production as long as the gas-oil ratio did not vary. By constant effective liquid saturation during steady state flow is meant the condition in which a saturation gradient is established in the vicinity of the well and remains steady as long as the gas-oil ratio remains constant. Increase in gas-oil ratio at higher rates of flow would be expected to cause a decrease in the effective permeability and consequent decrease in productivity index. These conditions have been observed to apply to field tests in a number of instances.

The rate of pressure build-up of wells and the application of the data have been discussed by Muskat.[3] The plot of the static datum pressure minus datum build-up pressure at time (t) versus t on semilogarithmic paper gives a straight line for the viscous flow of homogeneous fluids and for correct pressure data. In field practice pressure build-up data are frequently obtained which do not give a straight line function with t, but are closer to some fractional exponential function of t which lies between one-half and one. This condition arises from the change in liquid saturation gradient and effective permeability as the pressure build-up takes place. Increase in liquid saturation under the reservoir conditions usually encountered, will result in increase in the effective permeability and more rapid build-up than would be expected for constant effective permeability conditions. Another factor which also contributes to the effect arises from the fact that the permeability of the various strata composing the reservoir are not uniform, and that the effective diameter of the well bore and effective permeability of the individual strata may have been affected differently by effect of shot or acidizing. The rapid build-up of highly permeable strata may affect the saturation of other zones in the vicinity of the well bore and promote more rapid build-up of pressure.

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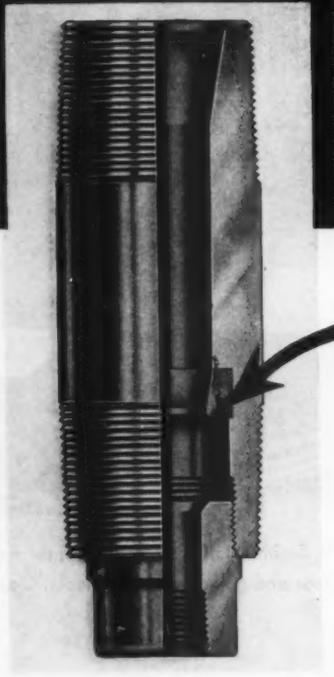

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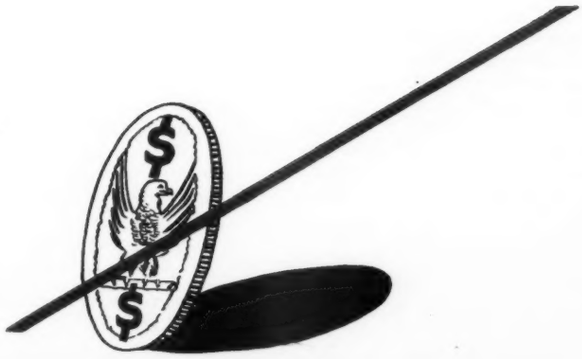

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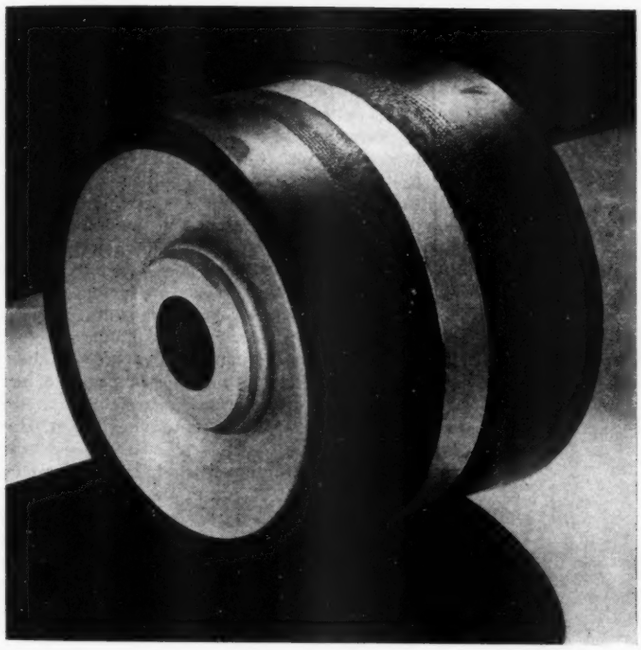

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the productivity index is a constant with time, it may be stated that there are logical reasons why it should vary in some cases and in others should remain approximately constant. In general the effective permeability of the formation during steady strata flow varies with the effective saturation of the formation. As the effective liquid saturation undergoes change with the productive life of the pool (except possibly water-drive pools) it is reasonable that the productivity index may undergo variations. However, the picture is complicated by the fact that gas which is evolved from the reservoir crude during the decline in reservoir pressure tends to segregate to form zones of high gas saturation or gas caps. Other factors which may change the effective area of the well bore, or modify the effective permeability of the sand in the vicinity of the well bore, can cause variations in the productivity index.

Productivity measurements on flowing wells have furnished a great deal of valuable information concerning well performance and operation. The data can probably be used to greater advantage than has been customary in the past. Under favorable conditions where the draw-down curve is linear, a determination of two or more flowing pressures will permit estimation of the closed-in static pressure without having to shut in the well.

Pressure build-up curves may also be used to determine the static reservoir pressure under favorable circumstances. A large number of wells have been observed to give constant productivity indices and linear draw-down curves over an appreciable range of flow conditions. The use of the total weight or volume of the fluids produced in place of the oil production will tend to straighten many draw-down curves. Care in conducting productivity measurements and accurate reporting of well completion and operating practices that may influence the data, will do much to increase the range of usefulness of the information.

Productivity Measurements in Pumping Wells

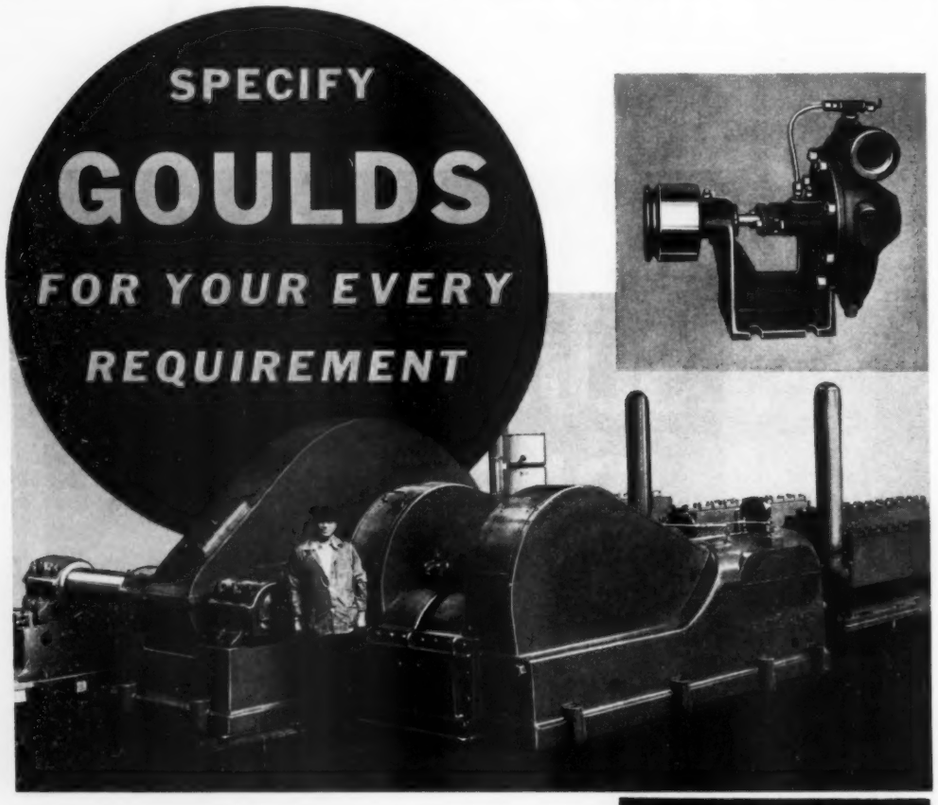
Productivity measurements in pumping wells are used for determining the production capacity of the oil-bearing formation penetrated by the well, and for determining the capacity and efficiency of the pumping equipment. Ordinary pumping potential tests, in which the subsurface pressures or fluid levels are not determined, may or may not represent the ability of the formation to produce oil. If the pump is of sufficient capacity and efficiency to maintain the producing fluid level at the pump intake, then the "datum potential" will represent the maximum capacity of the formation to produce oil when the pressure at the specified datum is reduced to a known practical minimum. Unless producing subsurface pressures or fluid levels are known, it is not possible to determine whether a pumping potential test represents the maximum capacity of the reservoir to produce oil into the well bore, or merely represents a test of the capacity and efficiency of the pumping equipment under given operating conditions.

Since pumping potentials have been employed as an important factor in the allocation of production in some areas, the operators in such areas, in order to obtain well potentials representing the ability of the formation to yield oil and not just merely the ability of the pumping equipment to lift oil under given operating conditions, have been forced to install pumping equipment of considerably larger capacity and greater endurance characteristics than is required for normal operations. This practice has greatly increased equipment costs for the development and operation of leases and has caused the industry to consider other methods for accomplishing the intended purpose.

It is outside the scope of this paper to discuss the various concepts and formulas that may be used as a basis for the allocation of production.[27, 28] It is necessary, however, to point out the difference in the concept of "potentials" based on productivity indices and those based on open-flow or pumping potential tests in which subsurface pressures and fluid levels are disregarded.

The open-flow or pumping potential test may well be considered as a measure of the amount of oil that may be produced or "captured" from a given well completed with the particular equipment, methods of well completion, and operating practices that have been selected by the operator. The amount of oil produced is dependent upon the capacity and efficiency of the equipment, the ability of the formation to produce oil into the well bore, the amount of peneration of the formation by the well, the gas/oil ratio, and the effect of shooting or acidizing the formation around the well bore. These circumstances tend to encourage the use of oversized equipment, excessive shooting and acidizing of wells, the drilling of unnecessary wells[28, 29] and in many cases, probably do not allow the oil to be produced under the most economical circumstances.

The productivity index eliminates the factor of capacity and efficiency of equipment in potential tests, but is affected by well completion methods, such as shooting or acidizing practices, which may modify the effective surface area of the well



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bore or change the effective permeability of the formation in the vicinity of the well. The working out of a suitable allocation formula which would include a properly weighted productivity index factor, would permit the operator to select equipment suitable for a given well under normal operating conditions and thereby affect a considerable saving to the industry.

Productivity measurements in pumping wells require slightly different procedures from those adapted to flowing wells. The presence of the pump and sucker-rods usually prevents the lowering of the recording subsurface pressure gauge into the well, except when it is placed in a special compartment attached to the bottom of the pump and run into the well as an integral part of the pump. This procedure makes it necessary to pull the pump before and after the test. The results of several tests at different rates of pumping may be recorded on one chart if a suitable clock movement is used in the subsurface pressure gauge. The tests require the determination of the static datum pressure and the producing datum pressure at constant rates of production while producing under steady state conditions. In conducting the tests, the static pressure is recorded, and then the well pumped at a given number of strokes per minute until the datum pressure and fluid level have become constant for that particular rate of production. The number of strokes per minute and rate of production can be increased to another given rate and the decline in fluid level and datum pressure recorded until they have again become constant. A linear drawdown curve indicates that the productivity index is constant and that one producing datum pressure is sufficient for the determination of the productivity index.

The running of the gauge with the pump limits the datum pressure to this position. If it is necessary to refer this datum pressure to some other depth, it may be accomplished by estimating or measuring the fluid density. For pumping wells producing fluids having low gas-oil and low water/oil ratios, the fluid level and fluid density may be used for the estimation of datum pressures with satisfactory accuracy.

The measurement of the rate of pressure build-up in pumping wells furnishes very useful data for the calculation of production capacity as well as for checking or determining reservoir pressures. Pressure build-up tests can also be conducted on wells that have been swabbed or bailed down and are then allowed to fill up. The method for estimating the production capacity of wells from pressure build-up data or from the rise in fluid level has been described by Muskat[8] and others.[5, 9]

The difficulties and expense involved in measuring subsurface pressures with recording subsurface pressure gauges in pumping wells has led to a search for a suitable means for determining fluid levels. A device for locating fluid levels by means of the reflections of sound waves has been developed and was recently described by Sawdon.[10] Devices of this character have proven worth while in locating fluid levels and checking the efficiency of pumps. If the accuracy of such methods can be improved to make it possible to determine the fluid level with consistent results under all conditions encountered, it will offer a rather inexpensive means of determining the productivity of pumping wells. At present the most accurate determinations are possible when some irregularity, such as change in casing size, top of liner, or a tubing anchor, located at a known depth is present to give a recognizable reflection of the sound waves on the recording chart near the reflection obtained from the fluid level.

While subsurface pressure gauges and other devices for locating fluid levels have considerable practical application for the determination of productivity, it appears that there may be other means of accomplishing the desired goal in those areas which produce fluids suitable for application of the method. If the pump is of sufficient capacity and efficiency to maintain the producing fluid level at the pump intake, then the "datum potential" will represent the maximum capacity of the formation to produce oil when the pressure at the specified datum is reduced to a known practical minimum. The selection of a definite datum level for the setting of pumps, during potential tests, at such a distance below the normal fluid level in the pool that pumping equipment suitable for normal operations may keep the fluid level pumped down to the pump intake, will permit the rate of production obtainable at the given fluid level to be determined. If the datum is selected so that the largest wells can be pumped down to the datum level without the use of oversized equipment, then a means of obtaining potentials which are independent of the capacity and efficiency of pumping equipment is available, and the more important objections to the usual pumping tests may be avoided.

In a new pool, the static fluid level or reservoir pressure is usually constant for a given datum over the area. In such cases the use of a definite datum for pump settings during potential tests would give all wells a comparable pressure draw-down, and the relative capacities of the formation to produce oil into the well bore would be established. After wells in a pool have been produced for a time, some variation in res-

(Contined on Page 78)

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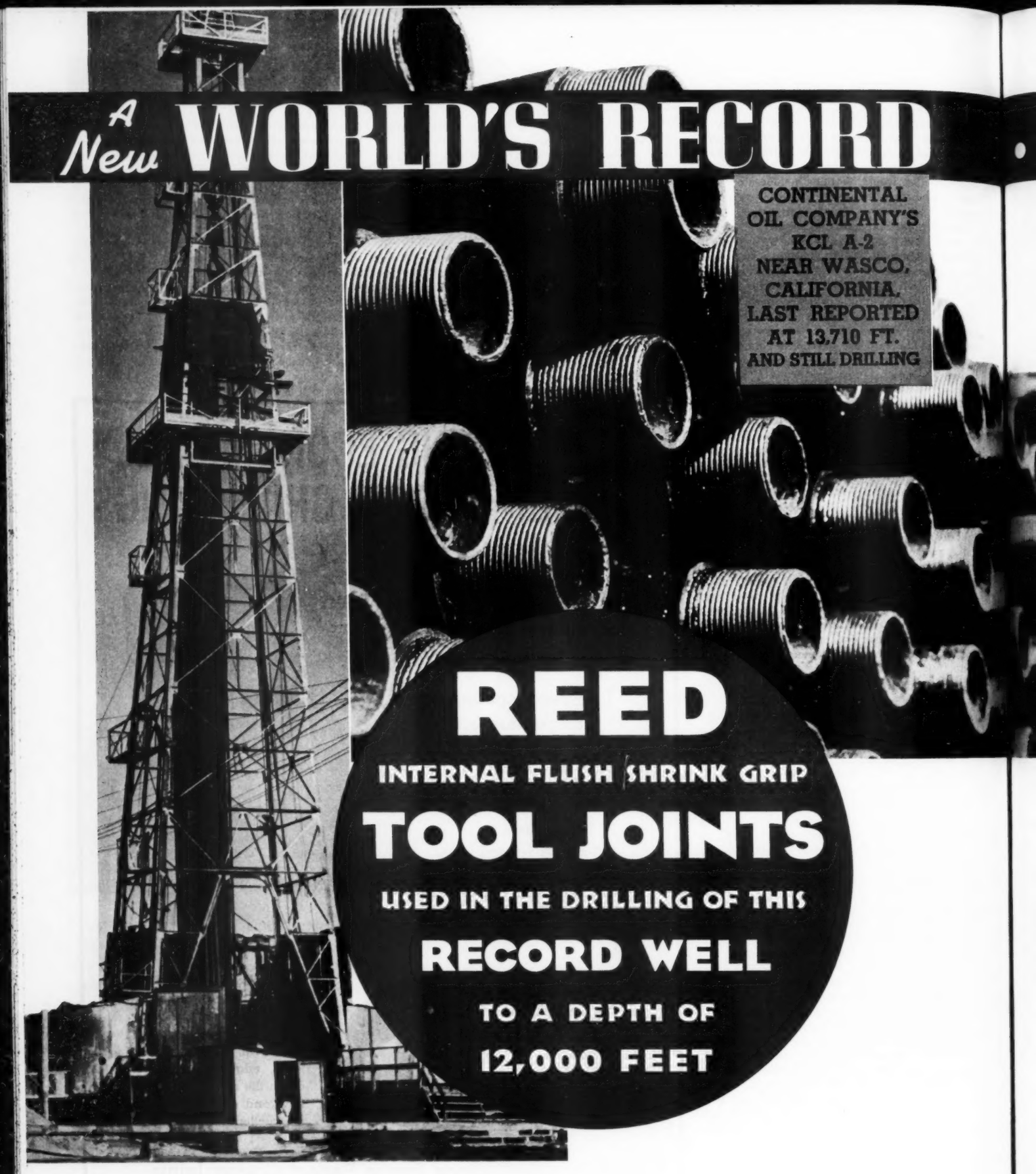

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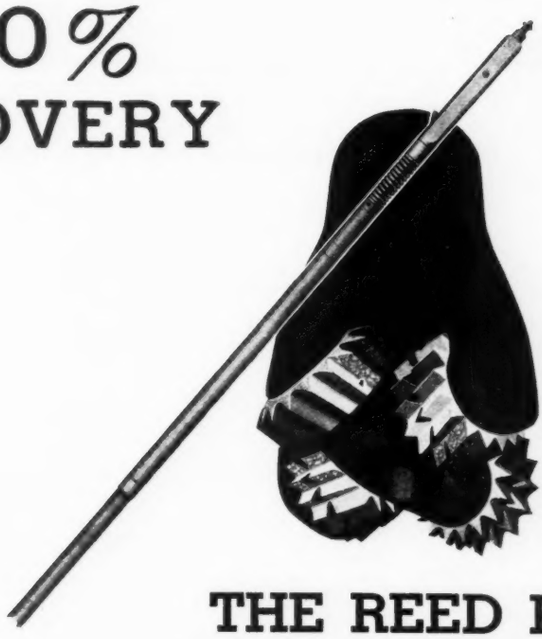

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ervoir pressure may develop due to unequal rates of fluid withdrawal or unequal rates of water encroachment into the reservoir. The use of a definite datum (elevation) for the setting of pumps would serve to maintain a constant back-pressure on the formation during potential tests, and if the static pressure had declined around a given well, it would permit the potential test to be taken under a smaller pressure draw-down, which would lower the potential and production rate and would tend to bring about an equalization of reservoir pressure in the pool. If the well was located near the source of water encroachment, the static pressure might be higher than average and would result in a slightly higher potential, and thereby tend to help maintain the reservoir pressure near a constant value.

The chief obstacle to the use of fluid levels for productivity measurements arises from the variation in fluid density, which results from the variation in the amount of water that may be produced from or may be standing in wells. This obstacle is encountered in all cases, however, except when the pressure is observed by means of a recording subsurface pressure gauge with the pump set near the bottom of the well. It may be possible to establish some acceptable correlations between the water/oil ratio of the production from a given pool and the fluid density at definite rates of production, which would permit suitable correction factors to be applied. Present indications are that this will prove a difficult problem. The advantages of using productivity measurements in pumping wells are of such magnitude that their practical application should be fully investigated and realized.

The second-half of Mr. Walls' paper will be published in a subsequent issue of The Oil and Gas Journal.

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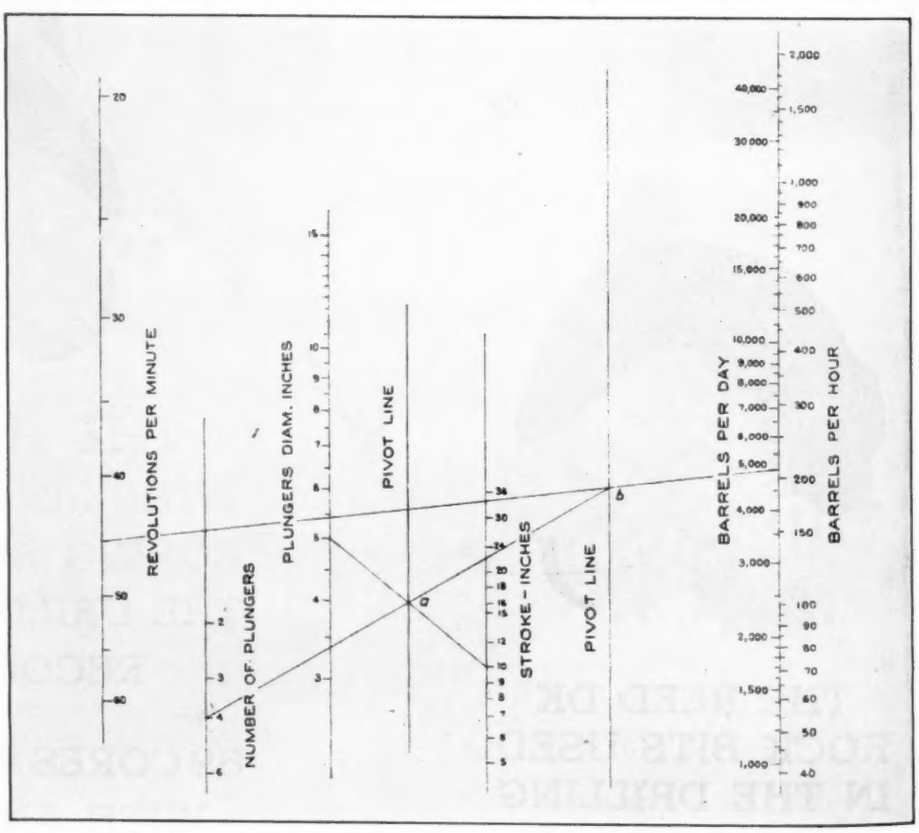
Little Tendency to Vapor Lock Found in 1937 Automobiles

Recent data compiled by the Cooperative Fuel Research Committee indicate that vapor lock in 1937 automobiles should be of comparatively rare occurrence where car speeds do not exceed 55 miles per hour. Of 23 different car models represented in the tests, only five gave vapor lock on gasoline having Reid vapor pressures below 9 pounds at an atmospheric temperature of 100° F. Where higher speeds, and correspondingly higher engine temperatures, were attained in the tests, the vapor-pressure limits were somewhat lower, although even then only six of the cars showed any signs of vapor lock at vapor pressures below 8 pounds. There were no oustanding difference between cars in different price groups.

The data compiled by the committee were submitted partly by the automobile manufacturers and partly by oil-refining companies. The tests were made under a variety of representative conditions and showed that vapor lock was most likely to appear during acceleration at full throttle after a stop of a few minutes' duration following driving at high speeds. The vapor-pressure limit was defined as the vapor pressure of the gasoline which would just produce incipient vapor lock as indicated by a momentary "cutting out" of the engine resulting from momentary failure of fuel to reach the engine. Gasolines having higher vapor pressures would, of course, produce increasingly severe vapor lock, although experience indicated that there was a range of from 3 to 5 pounds in vapor pressure between the limit for incipient vapor lock as defined above and that for vapor lock so severe that the car could not be operated. The actual limit which any individual driver might be expected to find troublesome would probably be between these two limiting forms of vapor lock.

Included in the technical work of the C.F.R. committee is a semiannual survey of gasolines available throughout the United States. The data for this survey are supplied by oil companies represented on the committee and are compiled for publication and distribution by the U. S. Bureau of Mines. In the report just issued it appears that 90 per cent of the regular- and premium-grade gasolines sold in the summer of 1937 throughout the United States had Reid vapor pressures between 5.3 and 8.7 pounds.

PLUNGER PUMP DISPLACEMENT AND PUMP SELECTION CHART



As an aid in determining the theoretical displacement of plunger pumps and also in selecting various combinations of plunger sizes and strokes to fit given conditions, Frank E. Hangs of Houston, Tex., has designed the accompanying alignment chart. A typical example of how the chart may be used was given by Mr. Hangs, as follows:

To find the displacement of a 5-inch by 10-inch pump with four plungers and operating at 45 r.p.m.: (1) Connect diameter and stroke. (2) Draw line through point "a" (intersection of pivot line and stroke-diameter line) and number of plungers. (3) Draw line through point "b" (point where line extended through point "a" crosses second pivot line) and 45 r.p.m. The number of barrels per hour, or per day, is then read on the line at the extreme right.

QUESTIONS ON TECHNOLOGY

By Charles K. Francis, Ph. D., Technical Editor

Uses for Rubber Greases, Their Composition and Manufacture

We desire information about the composition of greases containing rubber and would appreciate any directions covering the manufacture of such greases.—E. G. B.

Greases containing rubber are of two types; one in which a very small quantity of rubber is introduced for the purpose of increasing stringiness or raising viscosity. Some remarks were made about these greases in The Oil and Gas Journal, December 23, 1937, page 62. The second type includes the greases, used for special types of lubrication, which contain a large proportion of rubber.

There are two instructive articles on the subject, one by Sheppard and Ledig and the other in the Rubber Age. This discussion has been arranged from these sources.

Rubber greases have applications in many fields where it is essential to maintain a high vacuum. Although the quantity of grease required for such a purpose is not large, the standard of quality is extremely important, and users are naturally conservative in the materials employed; metal and glass connections are involved, and are quite different to the jointing medium employed for lower vacuum.

A stop-cock grease for accurate high vacuum work must lubricate the ground surfaces smoothly and at the same time must not work out too quickly; it must also have a very low vapor pressure and be as free as possible from objectionable chemical or solvent action. Until comparatively recently reliance was placed upon fixed oils, such as neat's-foot oil, which was mixed with lime or some suitable soap. Such preparations are quite unsuited to the purpose, since they tend to turn rancid, and in the latter condition have a marked corrosive action upon nonferrous metals, particularly brass; another objection to such compounded greases is that the component parts eventually separate to some extent, giving lack of homogeneity.

Good quality rubber is essential. Pale crepe rubber is often used but smoked sheets are said to give a better body. The grease or oil should be selected to suit the working conditions, including bearing pressure, but there should be very slight changes in viscosity over the working temperature.

Sheppard and Ledig suggest these compositions for the purposes indicated.

RUBBER GREASE COMPOUNDS

High vacuum:	
Pale crepe	31
Petroleum jelly (white)	24
Paraffin wax (36° m.p.)	5
General:	
Pale crepe	6
Petroleum jelly	5
Paraffin wax	1
Light:	
Smoked or pale crepe	10
Petroleum jelly	18
Paraffin wax (30° m.p.)	1

The mixtures should be stirred continuously for 190 hours at 310° F., the product being allowed to stand at least 10 days before use.

CHARACTERISTICS OF MINERAL OILS, JELLIES AND WAXES

Product—	Melting point, °F.	Viscosity, Redwood No. 1, seconds At 70° F.	At 140° F.	At 180° F.	At 212° F.
A	132	....	....	....	....
B	140	....	....	....	....
C	151	....	....	....	....
D	108	....	135	60	28
E	148	....	....	138	40
F	...	245	54	42	38
G	...	1,587	147	78	36

A, B, and C are paraffin waxes; D and E are mineral jellies; F is a light lubricating mineral oil, and G is a machine (mineral) oil.

RUBBER GREASES

Constituent—	Percentage composition Grease A	Grease B	Grease C
Rubber	8	15	15
Jelly D	60	..	..
Jelly E	..	85	..
Wax A	32	..	..
Oil G	..	..	85

General procedure. Oil or grease is placed in the treating vessel, the agitator started, and the temperature raised to 120° F. A suitable latex compound is added. The quantities generally added are in the magnitude of .005 to .05 parts of latex rubber, computed on the weight of dry solids of the latex to the total weight of the oil or grease. The temperature is gradually raised to approximately 210-215° F.—and this temperature maintained until the foam disappears. The agitation is continued throughout. The remaining material will be a water-free partial solution of rubber in petroleum.

References: Martin Sheppard and P. G. Ledig, Ind. and Eng. Chem., 19, 1,059, 1927. Rubber Greases, Rubber Age, Nov. 25, 1932, page 135.

Percentage Loss When Reporting Recovery Percentages

In plotting the curve for the distillation of a gasoline, is the percentage loss added to each percentage recovered before plotting against the corresponding temperature? Thus, 10% + 1.0% (Loss) = 11%, 20% + 1.0% (Loss) = 21%, etc.—J. S. F.

In the federal specifications for the several grades of gasoline it is provided: "Per cent evaporated shall be found by adding the distillation loss to the amount collected in the receiver at each specification temperature."

The A.S.T.M. method for distillation of petroleum products does not specify "per cent evaporated," the observations of the volume of distillate and temperature being "recovery."

Recovery residue and distillation loss are defined in the A.S.T.M. method as follows:

"The total volume of the distillate collected in the recovery graduate shall be recorded as the recovery.

"The cooled residue shall be poured from the flask into a small cylinder graduated in 0.1 ml., measured when cool and the volume recorded as residue.

"The difference between 100 ml. and the sum of the recovery and the residue shall be calculated and recorded as distillation loss."

References: Federal Specification for United States Government Motor Gasoline, Federal Standard Stock Catalog, VV-G-101a, April 16, 1936. A.S.T.M. Standard on Petroleum Products Designation, D 86-35.

CHEMICALS FOR THE PETROLEUM INDUSTRY

Ethylene Glycol Monomethyl Ether (Methyl Cellosolve)

Use—Solvent with petroleum naphtha as thinner and rapid dryer for varnishes. Sealer for transparent wrappers.

Form—Water white volatile liquid.

Formula—$CH_2O\ CH_2.CH_2OH$.

Specific gravity—0.961 to 0.966.

Boiling point—256° F.

LIMITATIONS

Acidity, as acetic, max., per cent	0.03
Boiling range	244°-259° F.

Note. Blended up to 10 per cent with special petroleum naphthas for making rapid drying varnishes.

Method of Determining Lag of Diesel Fuels

What is the meaning of ignition lag used in connection with fuel oils and how is it determined?—C. B. F.

Ignition quality of an engine fuel oil includes easy starting, low audible knock and relatively free running. The means for determining ignition quality of fuel oils has been discussed in a recent issue of The Oil and Gas Journal by J. S. Chandler. The material here has been arranged from this article.

The theory of combustion divides the process into three steps, (1) a delay period between the time the first portion of fuel leaves the nozzle and the point of "appreciable pressure rise" due to burning; (2) rapid burning of the fuel which has accumulated during the delay period; (3) the burning of the remainder at the same rate at which it is injected.

The first period is the ignition lag, the duration being dependent upon the ignition quality of the oil. A short ignition lag allows less fuel to accumulate during the delay period and reduces the shock produced by the rapid burning of this accumulation. It will ignite in a cold engine where a long ignition lag fuel would fail.

The test method for determining ignition lag is the bouncing pin method. The flow of an electric current is started at the time of injection by a contactor on the fuel pump shaft and discontinued by another contact actuated by a pin which bounces from a metal diaphragm in the cylinder head. The current flow is measured by a meter. Another method is the fixed ignition lag method. The essential elements are: (1) Two electromagnetic pickup units, one mounted over the cylinder diaphragm in place of the bouncing pin and another actuated by the feeler pin of the injection nozzle, each producing a voltage proportional to the rate of the respective motions. Either pickup may be connected to (2) a relay consisting of a gas-filled grid-controlled electronic tube (thyratron). This tube in conjunction with a condenser causes a short impulse of current to flow when the pickup voltage reaches a predetermined value. This impulse of current is led to (3) a small neon light mounted on a flywheel. By reading the angle at which the flash occurs for both injection and ignition and taking the difference, the lag is determined in degrees.

With the use of this apparatus, a method known as the Fixed Ignition Lag Method has been developed. Injection is adjusted by means of the timing device on the pump to 18 degrees before top center, then the point of ignition is made to occur at top center by adjusting the compression ratio. Thus a fixed lag of 18 degrees is used. The required compression ratio (R.C.R.) for each fuel is compared to that of the reference fuels and a rating thus obtained.

Reference: Fixed Ignition Lag Method of Testing Diesel Fuels, by J. S. Chandler, The Oil and Gas Journal, September 2, 1937, page 53.

Approximate Cost of Tankers

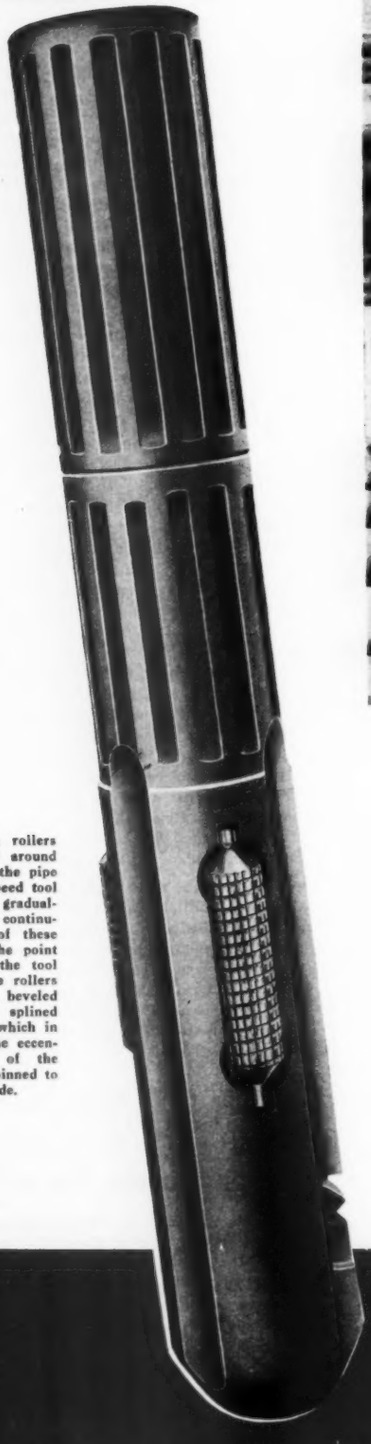
Could you furnish us with the approximate cost today of a tank steamer?—R. D. B.

The cost of a tanker may vary something like that of an automobile. The value of all ships, even of the same capacity, will depend on the material, design and workmanship.

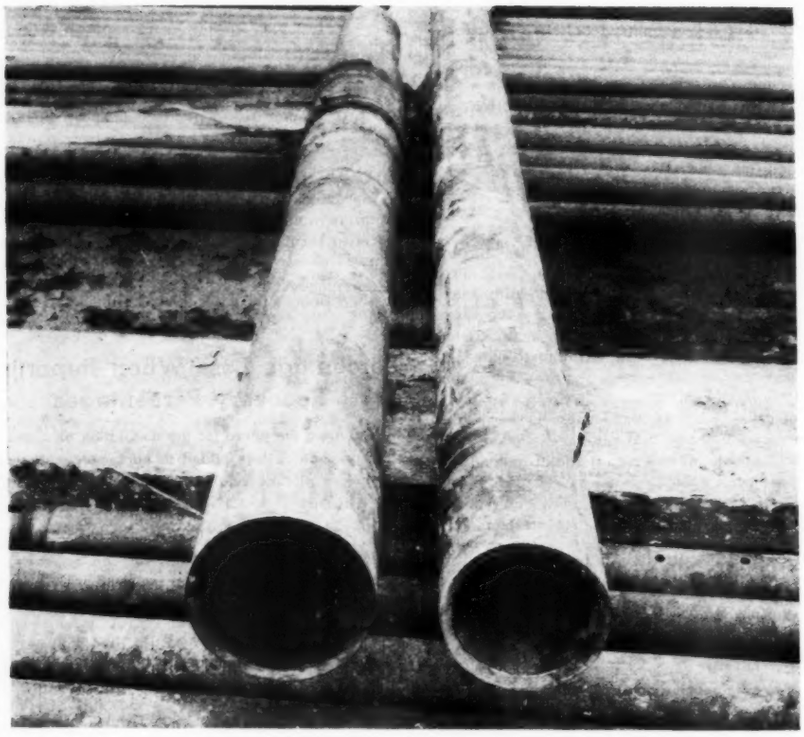
The Petroleum Times of September 4, 1937, reports the contract price for two tankers each of 14,500 tons deadweight capacity, at approximately £400,000, or $2,000,000 for the two. One with increased boiler capacity was to cost £206,250, or $1,031,250. These boats are equipped with diesel engines.

ABERCROMBIE'S INSIDE CUTTER

Cuts 'em Like a Lathe!



Three friction rollers ride smoothly around the inside of the pipe as the high speed tool steel knife is gradually fed by the continuous friction of these rollers into the point of cut. As the tool is rotated, the rollers contact the beveled friction rings splined to the shaft, which in turn drives the eccentric bottom of the shaft that is pinned to the cutter blade.



A smooth cut on the end of a piece of recovered pipe may not add to salvage values, but it proves the value of dependable cutting tool performance where the difference in success and failure means real money . . . gained or lost!

The Abercrombie Inside Cutter (shown at left) recently made a 5″ liner cut at 3,350 feet on the Clemville, Texas, workover job pictured here; and recovered 300 feet, including the liner packer. The cut made by Abercrombie Red Ball Service is reproduced above, alongside the lathe-cut end of the packer. You can see for yourself the results obtained by the Abercrombie Inside Cutter and the Red Ball Service Operator.

NOTE, at left, how the Abercrombie Inside Cutting Tool operates.

PROBLEMS FROM READERS

Edited by L. G. E. Bignell

Natural Gas for Oil Field Boiler Fuel

Please advise if casinghead gas or gas that is liberated by producing oil wells would be satisfactory in its natural state to use for boiler fuel. The gas I refer to is ordinarily separated from the oil at the well, and is burned as a torch. In discussing this matter with an oil well driller he was of the opinion the gasoline contained in this gas would probably prohibit the transportation of it through a pipe line on account of the accumulation or pocketing of the gasoline in the line, but since he was not positive of the information I will appreciate your advice.—F. L. J.

Unless there is something very peculiar about the gas you have in mind there is no reason why it cannot be transported and burned under a boiler. It has been done ever since the industry started. Such gas is also used for gas engines.

It is true that some drip gasoline may form in the line between well and boiler. But it is not difficult to trap out this fluid.

There are numerous burners for natural gas suitable for installation in oil field boilers. They operate at various pressures and it is usually necessary to place somewhere in the line a regulator by means of which the well-head pressure is lowered to suit the burner requirements.

There are numerous factors to be considered in using natural gas for boiler fuel and you are referred to "Natural Gas Handbook" by John C. Diehl, available from the Book Department of The Oil and Gas Journal.

Miscellaneous Statistics

Can you advise me where I may obtain the following information? Where and how was oil first developed? Date of first discovery in the United States? Total number of men employed in the petroleum industry? Approximate number of producing oil companies in the United States?—J. J.

There are no accurate answers to your questions. For instance oil is not "developed." It is a natural product. Oil fields are developed by drilling and if that is the intent of your question then it may be answered as follows:

The first commercial oil well was drilled near Titusville, Pa., by Colonel Drake and completed on August 23, 1859. This lead to development of the numerous oil fields in western Pennsylvania and to fields in Colorado, Kansas and California. However, crude oil was produced by the Chinese about 2,000 B.C. and secured from wells dug for brine from which salt was extracted.

There is no accurate way of estimating the total number of men employed in the petroleum industry. Such employes are scattered all over the world and the exact definition of an "oil company employe" would be hard to make.

From a 1937 directory it has been ascertained that there are 2,534 producing oil companies listed, but the list is by no means complete. These companies have home offices in 40 states.

If the above list of oil companies was secured by mail solicitation and the average number of replies were received to all letters sent out it is probable the 2,500 listed companies represent about one-third of the total number of companies on mailing list. This is by no means an accurate estimate and it would be very difficult to secure reliable data from which to compile a complete directory of producing companies.

Limestone Development Costs for Deep Production

I have a problem dealing with a limestone reservoir at a drilling depth of 7,000-8,000 feet. We would like to have any general data from you readily available on spacing density, drilling and lifting costs, percentage of proration, approximate decline rate of wells, and estimated recoverable oil content per acre, for fields comparable to the above for depth only, and also comparable for both depth and nature of producing formation where the two conditions occur together.—J. N.

You have presented a very interesting problem in your letter, and I am answering it immediately to give you such general data as I have at hand but the problem warrants careful study which I could only make after knowing a lot more about conditions than outlined in your letter.

I assume, in the first place, this property is located in some foreign land which would increase costs. I would refer you to an article in the December 30, 1937, issue of The Oil and Gas Journal on the Bahrein Island development, page 127. This is limestone production but at relatively shallow depths. Also to anything you can find about production practices in Iraq.

In the Oklahoma City field where the pay is found at about 6,500 feet the cost of drilling varied from $125,000 early in the development period to about $85,000 when the north extension wells were drilled about a year ago. An average cost of a 7,000- to 8,000-foot well would therefore be from $110,000 to $123,000 after the first well had been completed.

Limestone production will vary through a wide range. If there is a thick porous zone that will respond to acidizing it would be safe to assume a recovery of 20,000 bbls. per acre. Yates pool has produced over 10,000 bbls. to the acre to date and is still good for about 10,000 bbls. more oil. However, it is known that many other lime fields have not produced more than 7,500 to 10,000 bbls. per acre.

If you can arrive at some recovery figure that is satisfactory the well-spacing program would then be based upon placing the wells as far apart as they could be placed to guarantee a return of investment on the basis of drilling costs of $125,000 for each well. If oil is worth $1 per barrel it requires at least 125,000 bbls. to return the cost of the well, without considering other costs necessary to incur to recover this oil, and if the formation will yield 20,000 bbls. per acre then it follows that there must be at least 6.25 acres around each well to barely pay expense. Returns from 10 acres would be a minimum, and to insure a real profit on the venture that acreage should be at least doubled or one well to 20 acres would be the minimum to drill for such deep production.

However, if it is a well established fact that by conserving natural reservoir energy it is possible to drain at least 40 acres with each well, it would then follow that for these deep wells the well spacing could be best stepped up to 40-acre tracts. If the later development indicates that complete drainage cannot be accomplished with 40-acre spacing it would then be practicable and economical to drill a five-spot well in between four of the 40-acre spaced wells and this should permit the recovery of the remaining oil in each 160-acre tract.

Production costs in Oklahoma City now vary from as low as 11 cents per barrel with hydraulic pumps to 27½ cents per barrel with beam pumping. Submergible electric pumps produce oil for about 24½ cents per barrel. This oil is practically free of water. In limestone production it will be necessary to allow added cost for the handling of water which is almost certain to accompany the oil. The ratio of water to oil will be a determining feature of costs and water disposal will also enter into the problem at a later date. It is costing at least 2 cents per barrel to dispose of some salt water in West Kansas limestone production. This cost will limit the ultimate recovery of those fields because as water to oil ratio increases the total fluid volume to be pumped increases and the percentage of water to be disposed of increases so that the revenue from the oil can be quickly reduced to the vanishing point.

I do not know what to say about "percentage of proration" because I do not know what you refer to. In New Mexico where the oil is coming from limestone formations that have been acidized the wells had rated potentials up to 15,000 bbls. per day but were allowed to produce only about 160 bbls. per day. That factor is variable through such a wide range it is impossible to make any statement on the point without knowing more about your problem.

The decline rate in limestone fields is rather rapid but by the proper use of acid the rate of production can be stepped up and perhaps ultimate recovery increased. For information on acid treatment you are referred to the bibliography on page 59 of the Transactions of the Petroleum Division of the A.I.M.E., 1937.

Enclosed you will find several bibliographies prepared by the Technical Department of the Tulsa Public Library.

If the property is in West Canada you should have ample data in your files in the articles by Doctor Hume and others. Doctor Hume places the west flank reserves in Turner Valley at 250,000,000 bbls. That might be a criterion of some interest to you.

Dimensional Standards for Cable Tools

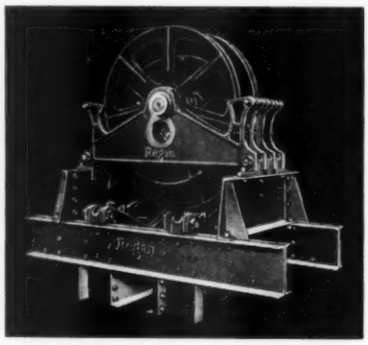
I am interested in securing data dealing with standard sizes of tool joint tapers, casing threads and sizes, and similar information covering general oil well machine work.—R. M. D.

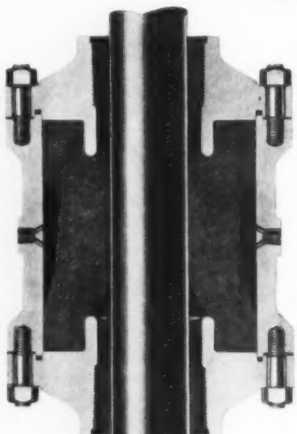
It is suggested you write to the American Petroleum Institute, Production Division, 1508 Gulf Coast Building, Dallas, Tex., for copies of A.P.I. Standard Specifications on tool joints, casing threads and similar data. I know of no general treatise on general oil well machine work. Such information will probably be found only in the files of manufacturers of this type equipment.

Regan Equipment
CONTRIBUTES TO DRILLING
World's deepest well

REGAN CROWN BLOCK *(Type B)*
REGAN BLOWOUT PREVENTER *(Type K)*
REGAN CASING HEAD *(Santa Fe Type)*

In congratulating the personnel of Continental Oil Company responsible for achieving the World's record depth in oil well drilling, it is with pardonable pride that we point to the Regan Equipment which played a part in making this possible.





The Regan 6-Sheave Type B Crown Block had already seen service on other wells before being used on K.C.L. A-2. This Block, originally designed for 200 tons safe load capacity, speaks well for the materials and workmanship built into it to provide the strength and factor of safety necessary to assure such performance. No replacements were necessary.

The Regan Type K Blowout Preventer, provided a means of instantaneous closure around pipe or kelly in the event of a threatened blowout, while the Santa Fe Casing Head provided a safe economic means of suspending and tying the several strings of casing together.

Ask for Bulletin or see Composite Catalog.

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● Right you are—but the Waukesha-Hesselman low compression oil engine can run *safely* on gasoline. Spark ignition and gasoline priming make this *the easiest starting oil engine in the world!*

Tropical heat or sub-zero temperatures make no difference to a Hesselman—turn it over and it starts.

A primer atomizes and sprays a small charge of gasoline directly into the air intake manifold. Low pressures...no higher than in a gasoline engine...make cranking easy. And the spark plug makes ignition certain.

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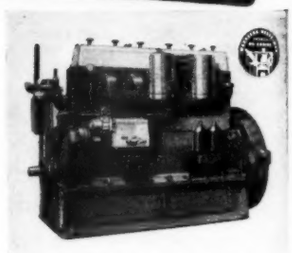

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FIELD OPERATIONS

Summarizing the Week's Developments

OKLAHOMA—Feature of the week was the completion of three offsets to the discovery well, in the Ramsey pool, southwest of Stillwater, Payne County. The three wells flowed 1,926 bbls., 1,958 bbls. and 1,879 bbls., respectively, on four-hour tests, or at the average rate of 11,526 bbls. per well per day. A new deep test south of the Hewitt pool in Carter County was started in section 6-5s-1w.

KANSAS—The Geneseo pool, Rice County, was extended one-half mile west in section 11-18-8w. Wildcats in section 28-20-8w, Rice County; section 33-11-16w, Ellis County; section 4-32-3w, Sumner County, and section 2-24-17e, Allen County, were reported showing oil. New wildcats were started in Ellis, Stafford and Reno counties, but operations generally were curtailed because of severe weather.

CALIFORNIA—Seven wells with an average daily production of 2,712 bbls. per well were completed in the Wilmington pool in Los Angeles Basin and the pool again went over the top in average daily production.

TEXAS—The feature discovery of the week in Texas was a 1,500-bbl. well producing from the Ordovician in the Oplin area, southwestern Callahan County in the Central Texas area. The Snyder field in Howard County, West Texas, was extended westerly by a 300-bbl. well and the Wasson pool (formerly the Denver pool), in Yoakum County, has a prospective east extension. The largest well yet completed in the Seminole pool in Gaines County started at 1,000 bbls. a day through tubing, following an acid treatment. Twelve locations were made in the big Goldsmith field in Ector County. A new producing structure was uncovered in southern Ward County. The K.M.A. pool in Wichita County was extended, and prospects for Ordovician production about 100 feet below the regular K.M.A. deep pay are indicated in a test 4 miles from production in the field. In the Gulf Coast a pool was opened in Matagorda County at 6,626 feet by a relatively small well for that depth. The Amelia and Nome pools were further defined. In Southwest Texas, pools were opened in San Patricio and Jim Wells counties. The deepening program in the Saxet Heights pool met with a setback when two wells drilled into water.

TEX-LA-ARK—Southwestern Arkansas wildcats drew most of the attention of operators in the tri-state district, but one of the tests in section 14-17-20, east of Magnolia, did not look encouraging. The Columbia County wildcats are very close to the horizon productive in the Buckner field in that county. North Louisiana and Texas border completions were of the routine kind. In southern Louisiana the Lafitte field was extended.

NEW MEXICO—A wildcat 11 miles southeast of the Hobbs field and near the Texas line, and another outpost 8 miles southwest of the Vacuum pool, both in Lea County, reported showings of oil. A new dry ice or carbon dioxide producing area was uncovered in section 12-6n-7e, Torrance County.

Completions in All Fields

(Week Ending February 28, 1938)

	Oil	Gas	Dry	Total	1938 total comp. to date	1937 total comp. to date
N. Y., Pa. and W. Va.	73	10	5	94	864	760
Ohio	4	12	2	18	162	147
Indiana	0	0	1	1	16	26
Kentucky	7	3	5	15	119	22
Illinois	11	0	3	14	93	1
Michigan	13	0	4	17	119	123
Kansas	14	1	14	29	315	302
Oklahoma	11	2	12	25	285	399
Texas:						
North Central Texas	23	0	8	31	388	391
West Texas	31	1	3	35	392	374
Texas Panhandle	8	3	1	12	131	100
East Texas	55	0	2	57	426	337
East Central Texas	3	1	3	7	65	97
East Texas Border	1	0	1	2	23	75
Gulf Coast Texas	14	0	3	17	196	192
Southwest Texas	14	0	13	27	318	528
Total Texas	149	5	34	188	1,939	2,094
North Louisiana	10	0	2	12	98	63
Gulf Coast Louisiana	4	0	3	7	88	74
Total Louisiana	14	0	5	19	186	137
Arkansas	1	0	0	1	33	14
Montana	1	0	0	1	8	13
Wyoming	1	0	1	2	24	15
Colorado	0	0	0	0	1	4
New Mexico	9	0	2	11	96	115
Utah	0	0	0	0	0	0
California	15	0	5	20	238	211
Total United States	329	33	93	455	4,498	4,383
Total previous week	372	31	92	495		
Difference	43	2	1	40		

Outstanding Fields--Highlights

(Week Ending February 28, 1938)

FIELD—	Rigs up	Wells drlg.	Weekly oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS						
Hastings	4	9	3	1,699	474	18,312
McCampbell	3	4	2	280	108	4,617
Saxet	2	7	0	0	584	35,812
Benavides	4	7	2	281	148	8,967
East Texas	40	86	55	3,208	24,650	426,000
Talco	1	7	1	270	615	24,300
K.M.A.	60	105	8	6,182	152	7,560
Ector County	15	41	11	7,549	887	26,750
Winkler County	6	27	5	2,517	1,582	28,300
OKLAHOMA						
Fitts-Jesse	4	13	1	255	962	60,825
Oklahoma City	3	13	0	0	1,055	101,975
KANSAS						
Barton County	8	27	1	200	293	10,005
Ellis County	6	20	0	0	282	7,645
Rice County	7	27	2	184	1,111	31,810
Russell County	8	41	6	4,031	1,016	28,705
NEW MEXICO						
Lea County	17	108	8	2,376	1,634	96,700
LA-ARK-TEX						
Rodessa, Ark.	1	9	1	480	64	7,685
Rodessa, La.	0	6	0	0	445	43,335
Rodessa, Tex.	3	21	1	470	396	29,860
Lisbon, La.	5	7	3	3,180	181	10,620
Shuler, Ark.	1	17	0	0	33	13,340
MICHIGAN						
Buckeye	5	22	7	2,122	364	27,148
ILLINOIS						
Central Illinois	30	95	11	5,460	295	28,050
CALIFORNIA						
Wilmington	8	30	7	15,202	390	113,980

Southwest Texas District

By
F. L. SINGLETON

Fields Opened in Jim Wells and San Patricio Counties

CORPUS CHRISTI, Tex., Feb. 28.—The discovery of two oil fields, one in San Patricio County and one in Jim Wells County, held the attention of operators in Southwest Texas the past week. Other interesting developments included the announcement of three projected deep tests in Duval County and favorable showings in several wildcats along the Balcones Fault line.

A field of major importance is believed to have been opened in San Patricio County by the completion of Plymouth Oil Co. No. 1 Mrs. F. Brigham, section 62, Pauls Subdivision of the Coleman Fulton Pasture Co. lands. The well is flowing 9.75 bbls. of 38.3-gravity oil per hour through a 9/64-inch choke, with tubing pressure 950 pounds and casing pressure 1,100 pounds. The hole is bottomed in the Frio sand at 5,665 feet and production is from perforations at 5,661-64 feet. The field is located due east of the White Point gas field.

While the above test was being completed interest was being shifted to another wildcat in the county, about 2½ miles southeast of the town of Gregory, where Danray Oil Co. is preparing to run casing in No. 2 Green. The hole is bottomed at 7,100 feet and casing is being cemented after a Schlumberger survey. Sand and sandy shale, showing oil, gas and distillate, were logged at intervals from 4,416 to 6,898 feet. Top of the Round Marginulina was reported topped at 6,000 feet, Flat Marginulina at 6,125 feet and Frio at 6,525 feet. The well is located along a recognized fault running east and west, and the present test is the fifth to have been drilled in the area. Location is in the T. T. Williamson Survey.

Jim Wells County

One mile northwest of Alfred, Jim Wells County, Rowan & Hope No. 1 Robert Adams, T.&N.O. Survey No. 19, is flowing at the rate of 3 bbls. of 47.2-gravity oil per hour through a 5/32-inch choke, with tubing pressure 110 pounds and casing pressure 290 pounds. The hole was drilled to a total depth of 5,512 feet, and a production test made following a Schlumberger survey which showed sand at 3,223-34 feet. Five-inch casing was cemented at 3,290 feet, and the well was completed through perforated casing at 3,225-29 feet. Protection acreage is held by Arkansas Fuel Oil Co., Humble Oil & Refining Co., Magnolia Petroleum Co. and several independent operators.

In the same county and about 5 miles southwest of Alice, H. H. Howell and others No. 1 Goldapp, reperforated casing at 3,546-60 feet, and is flowing gas and wash water through a quarter-inch choke, with casing pressure 600 pounds. Location is in the La Vaca Jose Marie Garcia Survey, offsetting same operators' No. 1 Kuether, which was temporarily abandoned after showing for a small gas well in the same formation.

To the north, in Live Oak County, James Chew No. 1 Alma McNeil is coring ahead after the hole was bailed dry. This well loomed as a possible pool opener several weeks ago when saturated sand was reported to have been logged in the Cockfield formation at 5,061-73 feet.

The third producer in the West Saxet field, Nueces County, loomed as Renwar Oil Corp. prepared to test No. 2 McKinzie. The sand section was topped at 5,797 feet and cored to 5,813 feet. Sand and streaks of shale showing oil were logged at 5,813-30 feet, the total depth, and 7-inch casing was cemented on bottom. Approximately a half mile east of production, C. Andrade No. 1 John Dun was coring for sand at 5,792 feet, and is reported to be checking favorably. Drilling activity gained momentum with the staking of four locations. Conroe Drilling Co. is starting No. 1 Louise McKenzie; Ran Morgan No. 1 fee, in section 411, A.B.&M. Survey, while Phillips Petroleum Co. made location for Nos. 2 and 3 Charles McKenzie in the B.S.&F. Survey No. 417.

Deepening Program

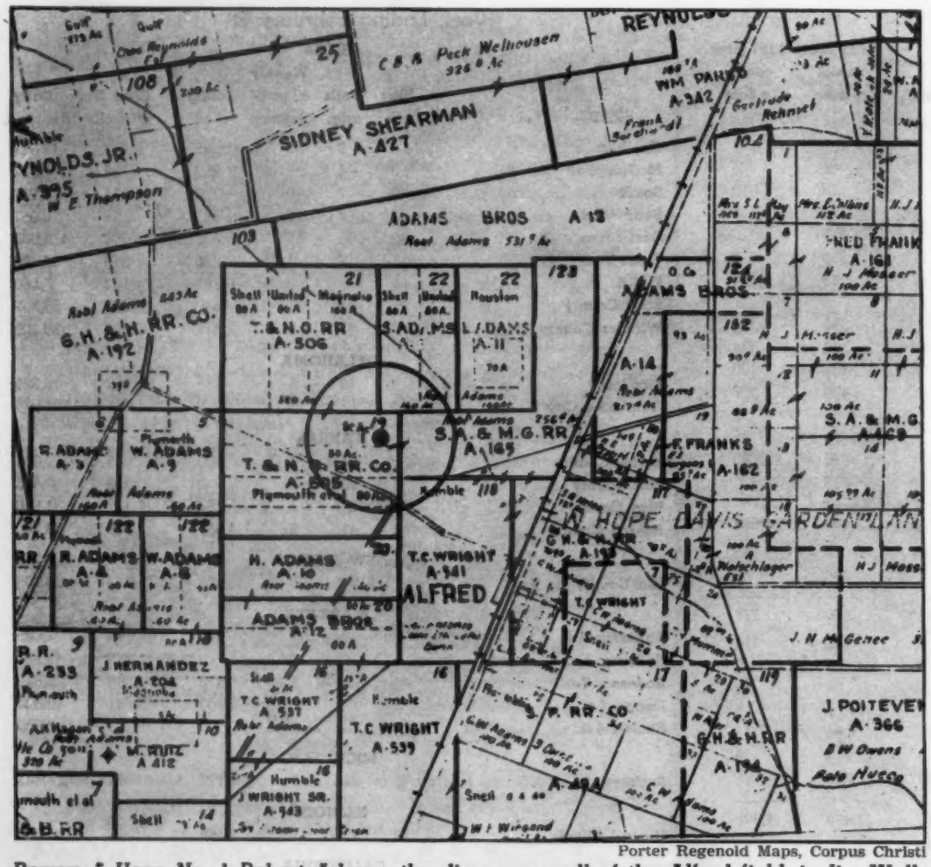
Prospects of a general deepening program to the newly opened 5,100-foot sand in the Saxet Heights field was discouraged the past week when two wells showed salt water. Richardson Petroleum Co. No. 1 A. C. Erwin, east of the discovery well was abandoned. It developed salt water when tested at 5,160-65 feet. The hole was drilled to 5,207 feet, and 2 feet of oil sand was logged at 5,170-74 feet. Port Oil & Gas Co. No. 10 Sherman is plugging back to the 4,000-foot sand, after salt water sand was logged at 5,160 feet and at 5,260 feet. The discovery well, J. K. Culton No. 4 Baldwin, has shown a large volume of salt water and only a few barrels of oil per day since its completion several weeks ago.

The abandonment of two wells in the Flour Bluff field further defined the east side of the field and prospects of a large-scale drilling campaign in Laguna Madre Bay were dimmed. The two abandonments were Humble Oil & Refining Co. No. 1 R. W. Duncan, Lot 24, section 49, and No. 4-A Kate Ritter, Lot 8, section 55.

Another prospective oil sand was logged in the South Clara Driscoll field in Wellington Oil Corp. No. 2 Lee M. Dugger, which recovered 270 feet of oil, 60 feet of oily mud and a small amount of salt water on a drill stem test at 5,076-90 feet. A previous test at 4,648-57 feet showed favorable results.

Midway between the Placedo and Keeran fields, Victoria County, Stanolind Oil & Gas Co. No. 1 Vandenberg and Hill drilled sand at 5,290-94 feet and cored sand showing oil and gas at 5,294-5,335 feet. Sand showing 6 per cent saturation was logged at 5,335-39 feet, and sand showing 4 per cent saturation was cored at 5,339-44 feet. The hole is bottomed at 5,344 feet and is being reamed preparatory to making a third drill stem test. Five hundred pounds of working pressure was recorded at 5,294-5,335 feet, and on a 3-minute drill stem test, with the seat of the testing tool slipping to 5,327-44 feet, it showed 50 pounds of working pressure and 450 feet of drilling mud. This is the second test to be drilled. The first well, No. 1 Henderson & Pickering, was completed. It produced 350 bbls. of fluid in 24 hours, a large part of it salt water.

In the same county and offsetting the discovery well of the East Telferner field, Harry L. Edwards No. 1 Robertson was being completed, and although no gauge was available, it was showing for a small oil well. The hole is bottomed at a plugged back depth of 5,130 feet and the well was completed through perforated casing at 5,118-22 feet. Drill stem tests have indicated a rather thin sand section and future field development is expected to be slow.



Porter Regenold Maps, Corpus Christi

Rowan & Hope No. 1 Robert Adams, the discovery well of the Alfred field, in Jim Wells County

In the Laredo District

In the Laredo district, material is being moved in for three deep tests in Duval County. Atlantic Refining Co. No. 1 Frank Gravis is located several miles northeast of the Benavides field in the Elizabeth Gravis Survey No. 88. In the northwestern part of the county, Magnolia Petroleum Co. has derrick up for No. 1 W. K. Hoffman, section 111, S.A.&M.G. Survey. In the J. Poitevent Survey, section 1, Conroe Drilling Co. is moving in for No. 1 Abraham Trevino. These three locations are a part of a general deeper drilling campaign now under way along the same general trend as the Benavides field, which is producing from the Cockfield formation.

In northeastern Starr County, J. L. Collins No. 1 Guerra, Share 20, Santa Cruz Grant, cored sand with an oil showing at 6,147-53 feet, and on a 15-minute drill stem test at 6,135-53 feet it tested a slight blow of gas, and is now coring in sand with an oil showing at 6,153 feet. The well is reported to be checking about 200 feet higher than the same operator's No. 1 Guerra, which was abandoned a few weeks ago after logging several encouraging showings.

Along the Balcones Fault line, interest was centered on two wildcats in Maverick and Dimmitt counties, each of which is receiving a production test. Wellington Oil Co. No. 1-A Chittim, Maverick County, was swabbing drilling mud, with a show of oil, from a lime formation, reported to be the Buda, at a total depth of 2,698 feet. Showings of oil and gas were found in the Austin chalk and lime formations. The present test was made after cementing 8¼-inch casing at 1,445 feet, and running tubing to 2,698 feet. On the same general trend and to the southeast in Dimmitt County, Paul Texas and others were running casing preparatory to testing No. 1 McKnight, Block 13, section 23, I.&G.N. Survey. The Dobie lime showing saturation was topped at 7,038 feet and cored to 7,065 feet. The operators were unable to make a drill stem test and the hole was cored to a total depth of 7,116 feet. These two wells are located on an anticline extending in a northwest southeast direction, with the Maverick well on the northwest end and the latter on the southeast end. Several thousand acres are under lease, and future development along this trend will be watched with interest.

A serpentine prospect was definitely uncovered in Miliam County by Tuxedo Oil Co. No. 1 Graham, located 7½ miles south of Buckholts in the Charles Cronea Survey. One foot of sand with an oil showing was cored at 1,136-39 feet, the lower 2½ feet being dry tight sand. At 1,139-42 feet, chalk, with small particles of serpentine, was found. The well is now shut down for orders.

In Bexar County and 9½ miles west of San Antonio in the Thomas York Survey, Hikok & Reynolds are preparing to acidize No. 1 Elvert Thomas after cementing at 1,142 feet.

In Caldwell County, Mac-Wag Tree Oil Co. No. 1 Roberts swabbed sulfur water from a lime formation at 2,713 feet, and the hole is being plugged back. Location is 2 miles west of Tilman.

In Medina County, Ewing Oil Co. is preparing to spud an interesting Edwards lime test, No. 1 Riff, 2 miles southwest of Dunlay in Survey 42. The structure was worked with geophysical instruments, and it is reported that the Navarro, Taylor, Anacacho, Austin Chalk, Eagleford, Buda and Georgetown formations will be cored.

COMPLETED WELLS

Completed wells in proven Southwest Texas fields, with their total depth, and the initial 24-hour production of the producing wells, were as follows:

Aransas County

McCampbell field: Atlantic Refining Co. No. 11-B Porterfield, 7,236 feet, plugged back 7,114 feet, perforated casing 7,104-08 feet, 140 bbls., three-sixteenths inch choke. Baltic Drilling Co. No. 1 Con-Brown, 7,125 feet, 140 bbls., three-sixteenths inch choke.

Caldwell County

Luling field: Grayburg Oil Co. No. 7 Hardeman, 2,077 feet, 8 bbls. of oil, 250 bbls. of salt water. Millican-Reed No. 2-B Lampking, 2,115 feet, 70 bbls., jetting. Philtop Oil & Gas Co. No. 3 Dorn, 2,078 feet, 400 bbls., open tubing. Salt Flat field: Martel Petroleum Co. No. 8 Connelly, 2,680 feet, 22 bbls. oil, 600 bbls. water; No. 1 Gray, 2,670 feet, 56 bbls., pumping.

(Continued on Page 92)

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Texas and Louisiana Gulf

By
NEIL WILLIAMS

New Matagorda County Pool; Two Fields Further Defined

HOUSTON, Tex., Feb. 28.—Pierce Estate No. 1 fee opened a field in the McCrosky area, northern Matagorda County, when it was completed for an initial production of 3.3 bbls. of oil per hour through a one-eighth inch choke with tubing pressure 400 pounds. Shut in casing pressure has ranged from 1,400 to 1,900 pounds. The completion of the well was marred to some extent by the fact that it continues to show 8 per cent sediment and salt water. Production is from the Marginulina sand, bottomed in a sidetracked hole at 6,626 feet. The salt water indicates that the discovery may be on the edge of the structure, and for that reason, the progress of the same company's No. 1 Paul Kruger, about 4,500 feet southwest, is being watched with considerable interest. Late in the week it was drilling below 5,500 feet.

To the west in Jackson County, H. V. Adams and otners No. 1 Foust, a wildcat in the Peter White Survey, has attracted attention due to a 2-minute drill stem test at 2,650-67 feet, which showed 260 feet of oil- and gas-cut mud. An additional core was taken and another test was scheduled to be made. There are two other active tests in the county, and material is being moved in by Humble Oil & Refining Co. for No. 1 J. R. Davis in section 20, I.&G.N. Survey, and Sam G. Harrison No. 1 J. Weadner, north of Ganado in the J. Williams Survey.

In Harris County

Stanolind Oil & Gas Co. and Amerada Petroleum Corp. No. 1 Maggie Peters, one-half mile southwest of the discovery of the Fairbank field, Harris County, has been completed as a distillate producer. Bottomed in salt water sand at 6,894 feet, with 5½-inch casing cemented at 6,891 feet, the well was completed through casing perforated at 6,823-26 feet. It flowed 21 bbls. of distillate in the first 23 hours through a three-sixteenths inch choke, with tubing pressure 1,900 pounds and casing pressure 2,100 pounds. The rig is being moved about a mile east of the discovery well to drill No. 1 Elizabeth White.

In the southern part of the county and located in the Friendswood field, Humble Oil & Refining Co. was preparing to complete five wells. No. 5 Beamer topped the sand at 6,079 feet, and is being completed at a total depth of 6,082 feet. No. 1 Jones and Gray topped the sand at 5,844 feet, and is bottomed in sand at 6,042 feet. No. 3 Kiesling topped sand at 5,863 feet, and is bottomed in sand at 6,048 feet, with 7-inch casing cemented at 5,855 feet. No. 1 Roberts topped the sand at 5,814 feet, and is running casing after coring to a total depth of 6,041 feet. No. 2 Settegast topped sand at 5,855 feet, and is being completed at a total depth of 6,040 feet.

North of the Orchard field, near the town of Simonton, J. R. Spencer is moving in material for No. 1 H. Boyle and others in the Thomas Westfall Survey, a Cockfield test.

Amelia and Nome Defined

In the Seabreeze field, Chambers County, Sun Oil Co. No. 1 Seabreeze Land Co., section 102, H.T.&B. Survey, cored gas sand at 8,716-39 feet, and is bottomed in salt water sand at 8,889 feet. A Schlumberger survey was scheduled to be made. Across the line in Jefferson County the Amelia and Nome fields were further defined with the abandonment of two outposts. Northeast of production at Amelia, Stanolind Oil & Gas Co. and Loffland Brothers abandoned No. 1 Kyle at 6,530 feet. One mile east of production at Nome, Sun Oil Co. No. 1 Morriss, Block 6, B.B.B.&C. Survey No. 398, was abandoned at 6,206 feet. In the central part of Jefferson County, Magnolia Petroleum Co. No. 3 Phelan, 933 feet southeast of No. 2 Phelan is coring in shale below 8,792 feet and has failed to encounter the discovery horizon at 8,400 and 8,600 feet.

Gulf Oil Corp. is running casing at the Segno field, Polk County, preparatory to completing No. 10 G. F. Wing. Sand showing oil was logged in both the 5,100- and 5,200-foot sands, and drill stem testing showed favorable results. The company's No. 2 Ragan is bottomed at 6,704 feet with 9⅝-inch casing cemented at 5,587 feet. It is scheduled to be drilled deeper.

A fourth producer for the southwest flank of the Orange field, Orange County, loomed as Gulf Oil Corp. ran casing in No. 1 Cora Granger. Broken sand showing oil was topped at 5,917 feet and cored to 5,926 feet, the total depth. The company's No. 1 Granger has been completed, but no gauge was available. Sand was logged at 5,937-51 feet, the total depth. The completion of the latter well has resulted in an offset location by Shell Petroleum Corp. for No. 1 E. V. Loeffler. Location was also made by Gulf Oil Corp. for No. 1 O. Duhon.

In the Sandy Point field, Brazoria County, Stanolind Oil & Gas Co. perforated casing in No. 3 Fite at 6,496-98 feet and a production test was being made.

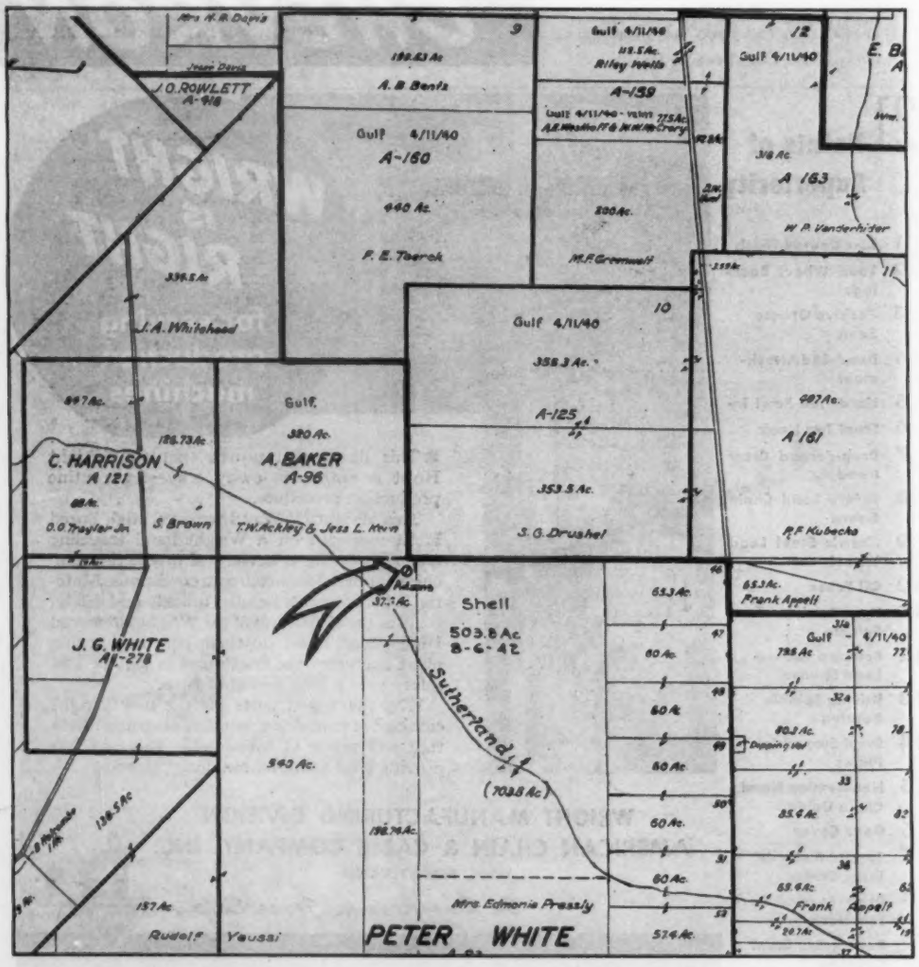
One mile north of production at Hitchcock, Red Bank Oil Co. is moving in to start No. 1 Maco Stewart, Lot 6, Block S, Cook & Stewart Subdivision, John D. Moore League. N. W. Hunter No. 2 Stewart, offsetting production has plugged back from a total depth of 5,250 feet, sidetracked and is drilling in a new hole below 2,700 feet.

Louisiana Coast

Along the Louisiana Coast and located in the Jennings field, Acadia Parish, Superior Oil Co. was attempting to free stuck drill stem in No. 1 Jules Clements, an outpost test about 1½ miles from production. The hole is bottomed at a sidetracked depth of 6,943 feet, just above the oil sand logged in the original hole at 7,028-88 feet. No. 1 Clements is the first deep hole drilled on the northwest flank and the outcome may result in an active drilling campaign such as that now taking place on the west and southwest flanks. In the southwest part of the field, Superior Oil Co. is preparing to complete No. 3 Iowa-Jennings, bottomed in oil sand at 6,847 feet, with 7-inch casing cemented at 6,757 feet.

In the Big Lake field, Cameron Parish, Union Sul-

(Continued on Page 101)



H. V. Adams and others No. 1 Foust, Jackson County, Texas, which has logged oil showings in the Miocene sand

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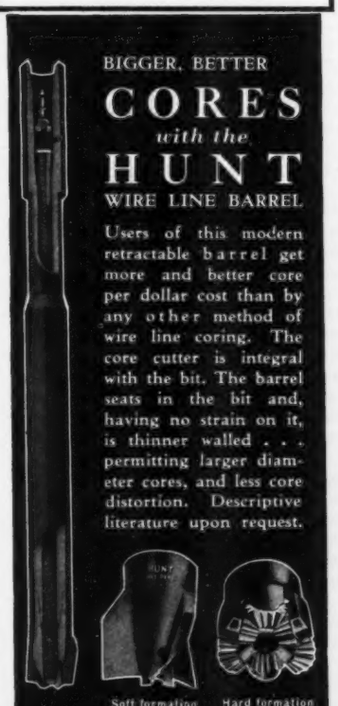

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Houston, Joinerville, Talco, Corpus Christi, Bay City, Alvin, Texas . . . Rodessa, Jennings, Houma, Louisiana.

Among Gulf Coast Drilling Contractors

Conroe Drilling Co. of Corpus Christi opened an oil area in San Patricio County for Plymouth Oil Co. with the completion of No. 1 Brigham, flowed at the rate of 216 bbls. of pipe line oil per day. Production is from the Frio sand through perforated casing at 5,661-64 feet. Considerable protection acreage is held by major companies and others and an active drilling campaign is anticipated. This same company is moving in a rig to the West Saxet field, Nueces County and is starting an interesting wildcat in Duval County.

Rowan Drilling Co. completed Amerada Petroleum Corp. and Stanolind Oil & Gas Co. No. 1 Peters, a half mile southwest of the Fairbanks discovery well, and the rig is being moved about a mile due east of No. 1 White. No. 1 Peters was completed through perforated casing at 6,823-26 feet, and it flowed 21 bbls. of distillate in 23 hours. Two other rotaries are located on the Venice dome in Plaquemines Parish for Tide Water Oil Co. while another is on location on the Danbury dome.

George Echols received contract from Sam Harrison for a wildcat north of Ganado in Jackson County. Other operations are reported in the Heyser field for Echols and Sinclair Prairie Oil Co., while in the Jefferson sector of the Rodessa field, he has one outfit running for himself.

Superior Drilling Co. opened a field in the McCrosky area, northern Matagorda County with the completion of Pierce Estate No. 1 fee, which is flowing 3 bbls. of oil per hour through a one-eighth inch choke from the Marginulina formation at 6,626 feet. The same company has another active rig about 4,500 feet southwest, where No. 1 Kruger is drilling below 5,500 feet.

Henry De Arman is completing Stanolind Oil & Gas Co. No. 3 Fite in the Sandy Point field. Perforations were made in the casing at 6,496-98 feet. De Arman has another outfit on location in Goliad County for Windward Oil Co.

Rutherford Drilling Co. is nearing the contract depth in No. 1 Stewart, in the West Saxet field, Nueces County, and it will probably be drilled below 7,000 feet. A production test is being made at Buckeye, Matagorda County on United North and South Development Co. No. 1 Stoddard, while at the Van Vleck, two rotaries are running for the Skelly Oil Co.

(Continued on Page 106)

Jess Frazier (extreme left), drilling superintendent for his brother, Jack Frazier, took time out to have this picture taken of his crew while rigging up in the swamps of the Trinity River in the Hardin field, Liberty County. Jack Frazier discovered this field in 1935 and two years later marked up a major extension to the structure which has resulted in an active drilling campaign

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Eastern Field Report

By STAFF CORRESPONDENT

Pure Oil Co. Gets Good Well in Old South Ohio Territory

PITTSBURGH, Pa., Feb. 23.—None of the wildcat deep tests reached the Oriskany sand during the week. Two wells are nearing completion. In Pennsylvania. Potter Development Co., William E. Snee and others ran 6-inch casing to bottom in the No. 2 Summit Hotel in South Union Township, Fayette County, and on Chestnut Ridge. Casing was cemented at 6,658 feet, the water bailed out, and drilling has been resumed. It is expected the first gas showing in the Onondaga should be reached within a few feet, as the top of the chert was reached at 6,657 feet.

In West Virginia, Pittsburgh & West Virginia Gas Co.'s test on the Jesse Chapman farm in Otter district, Clay County, was drilling at 6,282 feet, or 160 feet in the Corniferous lime. The thickness of this lime is unknown in this locality, but the Oriskany sand should be reached within the week.

SOUTHEAST OHIO

The best producer of the week in Southeast Ohio was Pure Oil Co. No. 5 P. J. Mavis in section 1, Jackson Township, Knox County. It was completed in Clinton sand at 3,168 feet and produced 140 bbls. the first day after it was shot. A timed bridge-shot was used, and the hole has not yet been cleaned.

A fair-sized well was completed in Licking County in section 12, Fallsbury Township, where the Emerald Petroleum Co. and others No. 4 I. M. Cochran found the Clinton sand at 3,019 feet. It produced 120 bbls. the first day after the shot. In Mary Ann Township, C. R. Settles and others No. 4 P. F. Shannon in section 15 was completed in Berea sand at 730 feet. It is showing for 2 bbls. a day.

In Belmont County, Natural Gas Co. of West Virginia completed No. 2 Samuel McMasters in section 21, Mead Township, in Salt sand at 1,500 feet. It is a gas well gauging 140,000 feet a day.

In Morgan County, Orton C. Dunn, Jr., attorney, completed No. 240 E. R. Dale at Joy, in section 2, Homer Township, in First Cow Run sand at 96 feet. It produced 1 bbl. of oil the first day after shot.

In Washington County, Ray Dewitt and others completed No. 6 Munn Fisher, 3 miles east of Barlow, in section 764, Barlow Township, in First Cow Run sand at 868 feet. It produced 4 bbls. of oil the first day after shot. In section 2, Barlow Township, Perdew Oil Co. completed deepening No. 1 Lonnie Perdew to the Macksburg stray sand at 1,486 feet. It produced 8 bbls. of oil the first day after the shot and about 30,000 feet of gas a day. In Warren Township, Washington County, R. M. Roby and others completed a test on the Freeman Pitts farm in section 26, in Berea grit at 1,975 feet. It is good for 2½ bbls. of oil per day.

SOUTHWEST PENNSYLVANIA

In Beaver County, Pennsylvania, Braden & Herron completed a test on the W. N. Bell farm in Hanover Township in Berea sand at 1,305 feet. It will make a half-barrel pumper.

In Greene County, Equitable Gas Co. completed deepening No. 1 Smith Fuller in Whiteley Township, at 3,104 feet, penetrating Bayard sand. The Fifth sand was topped at 2,889 feet, with 134,000 feet of gas at 2,891-2,893 feet, which has been tubed.

In Richhill Township, Greene County, W. L. Walters is building a rig on the Harry Clutter farm. O. I. Dille and others are drilling at 710 feet on the Jacob Livingood farm. In Center Township, Carnegie Natural Gas Co. was drilling at 2,161 feet in No. 3 J. B. Orndoff. South Penn Oil Co. was drilling at 2,225 feet in No. 12 Samuel Harvey. J. B. Orndoff is moving in tools for No. 2 G. M. Scott.

In Washington Township, Greene County, Equitable Gas Co. was drilling at 521 feet in No. 2 Sadie A. Connor. In Dunkard Township, Convex Glass Co. shut down No. 2 VanVoohris at 3,380 feet.

Washington County

In Amwell Township, Washington County, Carnegie Natural Gas Co. rebuilt the rig over No. 3 N. B. Redd, which was destroyed by ignited gas, and has recovered the tools lost at 2,672 feet. The hole will be deepened. In Cross Creek Township, Bloom and others were drilling at 575 feet in the test on the F. L. Cummins farm. In Morris Township, Duquesne Gas Co. has reached 2,120 feet in the J. E. Day test.

In Somerset Township, Victor D. Behm and others were drilling at 2,630 feet No. 1 J. D. Amos. Furman Nuss and others were drilling at 1,950 feet in the R. C. Garber test, with the Big Injun sand at 1,644-1,900 feet, and a show of gas at 1,689 feet. Wherry, Polonis and others were drilling at 2,010 feet on the Joseph Polonis farm.

In Allegheny County, Hope Construction & Refining Co. reached 3,911 feet in deepening No. 3 C. H. Malisee in Plum Township. The tools are now through the Bradford sand at 3,876-3,911 feet, with only a small showing of gas.

Deep Tests

The deep test of Norwood P. Johnston and others on the James McBurney farm in Mount Pleasant Township, Washington County, was shot in Oriskany sand at 6,795-6,825 feet and is now being cleaned out, but it is not thought the small amount of gas was increased.

On Chestnut Ridge, Greensboro Gas Co. test on the J. R. Thompson farm in Wharton Township, Fayette County, was drilling at 1,100 feet. The test of Wasson and others on the J. H. Sorg farm is down 710 feet. In Springhill Township, H. J. Houze-Convex Glass Co. is hauling in rig material on the Paul Dunham farm.

WEST VIRGINIA

In Lincoln County, West Virginia, Guyan Oil Co. completed No. 2 C.&O.R.R., in the Harts Creek district, at 1,476 feet, with the Big lime at 1,391 feet and about 50 bbls. of oil per day at 1,466-76 feet. It will be acidized.

In Pleasants County, Ward & Deem completed No. 2 Cassie Dye heirs, Washington district, in Cow Run sand at 513 feet. It is good for 1 bbl. per day. In this district, W. C. Patterson drilled a second test on his fee through Injun sand to 1,573 feet, and it was dry. In Lafayette district, Sud Powell completed No. 2 Cox at 1,880 feet, in Squaw sand, and it is showing for 10 bbls. of oil per day along with a small amount of gas.

In Wirt County, Smith & Kerns completed an Okey Nutter test in Burning Springs district, in Injun sand at 2,216 feet. It is good for 4 bbls. of oil a day and 92,000 feet of gas.

Gas Wells

In Cabell County, Earl Smith and others test on the Aubrey Chapman farm in McComas district was completed at 2,409 feet, a gas well. Berea sand was found at 2,338-56 feet with 450,000 feet of gas in the Berea. In this district the Burnie Curry test on the J. T. Morrison farm is a gas well at 1,403 feet, good for 200,000 feet per day at 1,360-70 feet.

In Gilmer County, Glen Bush's test on the Anna Belle King farm in Glenville district was drilled to 1,647 feet. Big Injun sand was topped at 1,590 feet with 260,000 feet of gas at 1,625-35 feet. In Center district, D. W. Simon completed No. 2 E. C. Frame through Injun sand at 2,097 feet and it is a gas well gauging 400,000 feet a day. In this district, Null & Moorhead completed a well on the Arthur Divers farm in Injun sand at 1,850 feet, good for 104,000 feet a day before a shot. In the same district, Chartiers Oil Co. No. 16 Daniel Huffman drilled through the Injun sand at 2,156 feet, and was dry.

In Marion County, Hope Natural Gas Co. deepened No. 2 William McHall to 3,297 feet, and no additional sands were found below the Fourth sand. It is in Mannington district. In Paw Paw district, the Owens-Illinois Glass Co. deepened the test on the Larney Moore farm to 2,660 feet through the Fifth sand, and it was dry.

In Putnam County, V. C. Smith and others completed a test on the J. I. Gibson farm in Teays Valley district at 1,025 feet, Salt sand, and it is a gas well gauging 640,000 feet a day.

In Kanawha County the Pure Oil Co. deepened No. 274 Williams Coal Co. to 3,302 feet. Weir sand was found at 3,016-3,111 feet, and Berea at 3,259-3,301 feet, with 6 bbls. of oil per day from the Weir and 37,680 feet of gas from the Berea.

Oriskany Gas Field

The test of Joe Rubin on the Lawrence Smith heirs farm in Poca district, Kanawha County, was shot and the gas increased to 6,660,000 feet a day. The top of the Oriskany was 4,924 feet. This increase of gas from the last week's report assures additional drilling northwest of Sissonville, as it opens up 2½ miles of territory 30 degrees northwest of that town. In this district the United Fuel Gas Co. completed No. 4,786 C. C. Fisher at 4,845 feet, with Corniferous lime at 4,726 feet. The final gauge after the shot was 9,312,000 feet of gas per day. In this district, Linden Drilling Co. completed the A. T. Mairs heirs test at 4,828 feet with the Oriskany topped at 4,816 feet. It made a final gauge of 19,893,000 feet of gas per day.

The final gauge of the United Fuel Gas Co. on No. 4,764 Oscar Gibson after a shot was 11,159,000 feet a day, and on the L. K. Johnson and others No. 4,780 was 4,311,000 feet a day. This company topped Corniferous lime at 4,957 feet in No. 4,767 A. J. Bruen and others, and at 4,803 feet in No. 4,779 A. A. and William Beane.

In Poca district 2¼ miles east of the Jarrett well, northeast of Sissonville, the Hays Oil & Gas Co. topped Corniferous at 4,826 feet on the Harry L. Evans farm, and cased to 4,842 feet, and resumed drilling. This will test the sand conditions between the James Haynes farm to the east and the Jarrett well. Mullins Gas Co. topped Corniferous at 4,771 feet on the Della M. Faber farm and ran casing and resumed drilling. In this district, Glen Oil & Gas Co. made a location on the James A. Haynes farm at the eastern edge of the pool. In Poca district the Llosag Fuel Co. was spudding on the H. C. Matthews farm. Columbian Carbon Co. started drilling on the Nelson H. Cavender farm in Union district. In Poca district, Joe Rubin started drilling on the Carney heirs farm. This location is over a mile west of the test on the Lawrence Smith heirs farm.

In Elk district, Columbian Carbon Co. was drilling at 5,160 feet on the Nora Hamilton farm and at 700 feet on the Margaret Rayhill farm. The Cameron Oil & Gas Co. had reached 1,800 feet on the Henry Hansel farm.

Deep Tests

In Wood County, Belmont Quadrangle Co. is drilling by lost tools in the deep test on the C. D. White farm in Steil district and making fair headway. In Harris district, Potter Development Co. was drilling at 580 feet on the W. H. Orem farm.

In Jackson County, W. H. Petry lost another string of tools in the test on the D. O. Curry farm in Ravenswood district, after reaching the Oriskany sand. There are three strings in the hole. In Ripley district, the Potter Development Co. is drilling at 1,375 feet on the William T. Chancey farm.

(Continued on Page 99)

California Field Report

By
L. P. STOCKMAN

Voluntary Cut in Output Is Made by California Oil Men

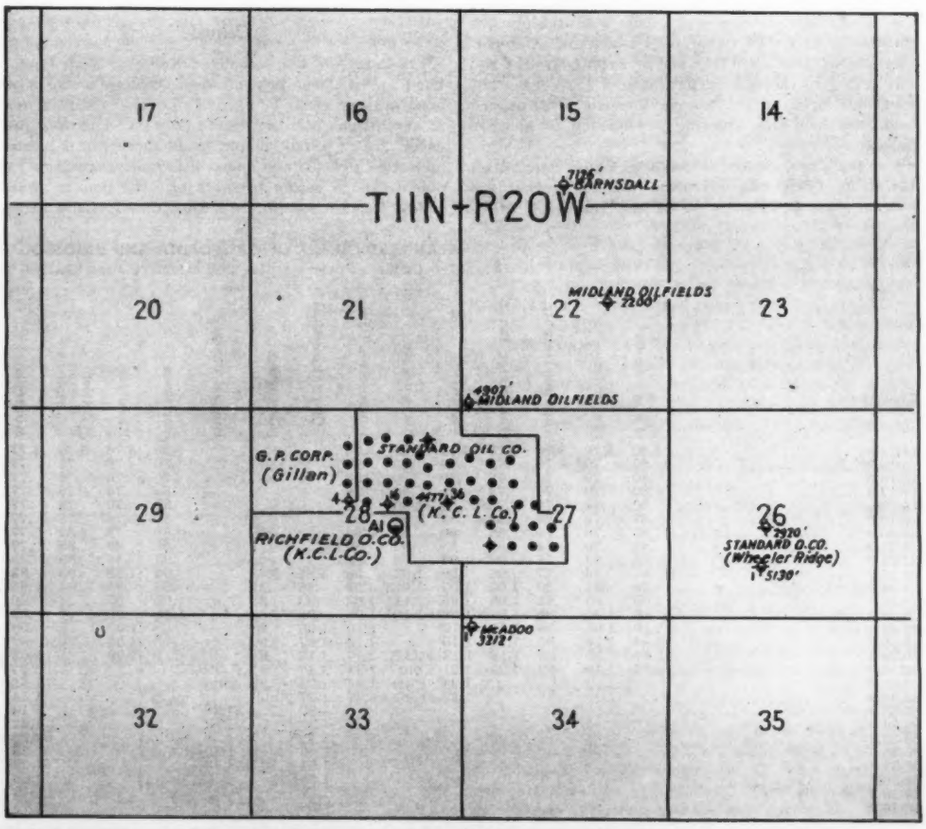
LOS ANGELES, Calif., Feb. 28. — California operators, recognizing the probability of an early reduction in crude oil prices if production continues at its present rate, have agreed to effect a reduction in production all down the line. Union Oil Co. started the ball rolling by pinching back its Rio Bravo discovery well from 2,580 bbls. daily to 500 bbls. per day, and operators in the Long Beach Harbor section of the Wilmington field agreed to restrict well production to a maximum of 2,000 bbls. per day on or before March 1. A reciprocal tightening up is also expected in other fields where excesses of various amounts prevail. A total of 3,750,929 bbls. of crude and refined oil was put into storage in December and substantial accumulations were made during January and February. Crude oil production has been averaging in excess of 700,000 bbls. per day since November 1, 1937, and had reached a point where drastic disciplinary action would soon be necessary unless corrective steps were taken immediately. The decision reached a few days ago to reduce crude oil production to the approximate consumptive demand should exert a stabilizing influence in both crude and refined oil markets. Crude oil prices at the well have remained unchanged since June 22, 1936, and gasoline prices in Pacific Coast territory have shown a similar degree of stability and a freedom from the violent fluctuations that characterized market activities earlier in the past decade.

The North Belridge, Canal, Canfield Ranch, Greeley, Rio Bravo, Ten Section and Santa Maria Valley fields, due to their present curtailment, will probably remain at their current levels but some additional restriction is expected in several other fields in San Joaquin and Los Angeles basins. Operators in the Long Beach Harbor section of the Wilmington field have been producing wide open for the past month with the result that the field's production rose to 115,000 bbls. daily in the latter part of February. The agreement to limit well production to a maximum of 2,000 bbls. per day is not especially commendable but it represents the most favorable concession that could be secured from a minority of operators who dominate productive conditions in an area undergoing intensive development. Bankline Oil Co. started restricting production on February 25 and other operators have already started pinching back production in conformity with the proration agreement. This action is expected to reduce production of the Wilmington field to approximately 100,000 bbls. per day but it is not at all improbable that Union Pacific Railroad and General Petroleum Corp. will effect an additional curtailment and thus bring the average of the field below the present objective. Ten new wells located in the area now in its flush stage are scheduled for completion within the next fortnight and if they show initials comparable with recent completions field production will show a substantial increase. This may necessitate a reduction in the present allowable maximum well production from 2,000 bbls. per day to either 1,500 bbls. or 1,000 bbls.

Wildcat Exploration

The large amount of acreage leased by California operators during the past few months is evidence of the recognition of the importance of acquiring proved reserves for development after the present period of excess production is terminated. Aggressive exploration has resulted in the discovery of several fields of primary importance in the past few years but it is significant to note that with the exception of the Wilmington field none of these primary discoveries is causing any undue effect on state production. Proved acreage in the Greeley, Ten Section, Canal, Rio Bravo and Canfield Ranch fields is all held in large blocks which fact enhances curtailment and permits operators to develop their holdings conservatively. Continental Oil Co. heads the list of prospectors due to its world's deepest wildcat in the Wasco district of Kern County which has reached a depth of 13,709 feet and will be carried down to an undetermined point. In the Wasco district, Continental Oil Co. will soon begin a wildcat in the northwest corner of section 17-30-26, approximately 2 miles north of the Ten Section field; due east of the Canal field; 1 mile southeast of Ohio Oil Co. No. 2-E in the Strand district and about 7,000 feet north of an outpost in section 20-30-26, the Ten Section field abandoned by Standard Oil Co. at 8,900 feet. Continental is believed to have located a seismograph high and will probably begin drilling operations within a few weeks.

Standard Oil Co.'s next wildcat in San Joaquin Valley will be No. 18-1 Kern County Land in section 29-28-26, Una district of Kern County, about 5 miles due north of the Greeley field and about 4 miles northeast of Union Oil Co.'s discovery well in the Rio Bravo field. The derrick is up and rotary drilling equipment should be on ground within a few days. Richfield Oil Corp. has completed derrick for a wildcat in the Wheeler Ridge district in the extreme southern end of San Joaquin Basin and has location staked for another on the Potrero Hills structure in Solano County where the company recently leased 7,800 acres. No. 1 Potrero Hills will be in section 10-4-1 near Fairfield, and approximately 15 miles north of Martinez. The Texas Co.'s next wildcat will be located in the Santa Monica district of Los Angeles Basin if the Los Angeles City Planning Commission accedes to a request for a zone variance permitting development work. The Texas Co. proposes to drill its wildcat on five acres between Morningside Way and Lake, a small street, and the northerly extension of Penmar and Glyndon avenues. The location is approximately midway between Pico and Venice boulevards and about 7,500 feet inland from the tideland at Ocean Park. Four bids have been received by the Los Angeles Board of Public Works from applicants seeking to lease the Hyperion sewer treatment property near El Segundo and while no lease has yet been signed, Richfield Oil Corp. appears to be the highest bidder. This company's bid consists of a $2,500 bonus and an additional bonus of $30,000 to be paid from 5 per cent of oil and gas produced. The bid calls for a royalty of 17 per cent of the production of each well not exceeding 100 bbls. per day during a calendar month; a royalty of 20 per cent for a production of more than 100 bbls. and not exceeding 500 bbls. a day; a royalty of 23 per cent for a production of more than 500 bbls. per day and not exceeding 1,000 bbls. and 26 per cent on a production in excess of 1,000 bbls. per day per well each calendar month. The royalty on gas produced is placed at 21 per cent. C. A. Messenger offered a straight royalty of 21 per cent and the Burnoel Petroleum offered 16⅔ per cent royalty and a rental of $1,000 per acre occupied during production. Interstate Investment Corp. bid 16⅔ per cent royalty for a well producing under 500 bbls. per day and 20 per



Richfield Oil Corp. is starting a wildcat in section 28-11-20 southwest of the Wheeler Ridge field, Kern County, in the extreme southern end of San Joaquin Basin

cent royalty for all production in excess of the minimum. Productive possibilities of the Tejon Ranch-Grapevine district of Kern County remained to be determined due to the inconsistent production of two wells completed up to the present time.

Wilmington

Seven wells were completed in the Wilmington field during the past week. General Petroleum Corp. finished four new wells for an aggregate initial daily production of 11,280 bbls. No. 7 Harbor Community flowed 4,560 bbls. of clean 25.4-gravity oil per day from 3,900 feet. The hole was finished with a full string consisting of 2,800 feet of 8⅝-inch and 1,100 feet of 6⅝-inch landed at 3,900 feet. The 8⅝-inch was perforated at 2,420-2,700 feet and the 6⅝-inch was perforated at 2,830-3,310 feet, 3,350-3,600 feet and at 3,640-3,900 feet and cemented through perforations at 2,828 feet. No. 34 Ford was completed flowing 3,280 bbls. of clean 26.3-gravity oil per day from the Ranger and Terminal zones, and No. 37 Ford was completed flowing 3,150 bbls. of exceptionally clean 26.4-gravity oil per day from 4,100 feet after the hole had been finished with a string of 8⅝-inch landed on bottom and perforated at 3,000-3,820 feet and at 3,900-4,100 feet. No. 2 Blinn was finished pumping 290 bbls. of clean 17.1-gravity oil from the Ranger zone at 3,270 feet. This hole was completed with 402 feet of 6⅝-inch liner including 360 feet of perforated landed at 3,269 feet.

The Los Angeles Board of Harbor Commissioners has served notice to General Petroleum Corp. that the latter has violated provisions of the board's order No. 1543, and has ordered an immediate correction. This notice is the result of General Petroleum Corp.'s endeavor to enhance crude oil curtailment by reducing production. The general manager of the harbor board informed the commissioners that General Petroleum has drilled 15 wells on property in the harbor district and that during the month of January, 1938, the total production aggregated 2,959 bbls. per day or a daily average of 197 bbls. per well. This lease calls for a royalty of 26⅔ per cent and the commissioners have ordered the company to increase production on the basis of not less than 60 per cent of the estimated potential production. Hancock Oil Co. completed No. 2-A Harbor flowing 3,510 bbls. of clean 27.6-gravity oil and 1,700,000 feet of gas per day from the upper and lower Terminal zones. The Ranger was still flowing to pump when this production gauge was made but will probably clean up in a day or so and boost the production of the well. No. 2-A Harbor was finished with a full string of 8⅝-inch carrying perforations at 2,509-2,810 feet and at 2,893-4,007 feet and was cemented through perforations at 2,890 feet. The well was brought in flowing through a 32/64-inch bean and has been showing a tendency to increase pressure.

In the older section of the Wilmington field Allied Petroleum Corp. has completed No. 24 flowing 254 bbls. of clean 16.8-gravity oil per day through a 20/64-inch bean from 3,007 feet. This new well was finished with 435 feet of 8⅝-inch liner including 398 feet of 60-mesh landed at 3,005 feet and 2,800 feet of 2½-inch tubing with packer. Black Gold Oil Corp. No. 7 was completed pumping 161 bbls. of 16.5-gravity oil per day from 3,636 feet. The Los Angeles City Council has lifted drilling restrictions in the area west of Avalon Boulevard in the Wilmington field and several wells are expected to get under way in the immediate future. This area is proved up for production as there are a number of producing wells located just east of Avalon Boulevard. A week or so ago the council lifted drilling restrictions in the area north of Anaheim Boulevard and this week the council has lifted restrictions south of Anaheim Boulevard, provided, however, that no drilling can be done within one block north and south of Anaheim. The extension voted includes the area bounded by 170 feet west of Avalon Boulevard to Wilmington Boulevard and from 120 feet south of Anaheim Boulevard to B Street; the area surrounded by Marine, Fries, Denni and 120 feet north of Anaheim Boulevard and the district bounded by Marine Avenue, J Street, 170 feet west of Avalon Boulevard and a line 120 feet north of Anaheim Boulevard.

Canal

Shell Oil Co. has completed No. 72-A Kern County Land in the Canal field of Kern County flowing 2,206 bbls. of very clean 36.8-gravity oil and 1,920,000 feet of natural gas per day from 8,210 feet. This new producer, Shell's initial completion in this field, is located in section 14-30-25 and shows a tubing pressure of 150 pounds and a casing pressure of 1,000 pounds. Shell staked location for No. 2-13 Kern County Land in the northwest corner of section 13-30-25 about 1,300 feet east of No. 72-A Kern County Land. Ohio Oil Co. discovered the Canal field last year and has completed two good wells since that time.

Ventura Avenue

Tide Water Associated Oil Co. completed a deep well in the prolific Ventura Avenue field when No. 18 Hartman was brought in doing 986 bbls. of 29.6-gravity oil per day on gas lift from 10,090 feet. This well produced a net of 475,000 feet of gas along with the oil. It is producing through a 44/64-inch bean and shows a tubing pressure of 175 pounds and a casing pressure of 700 pounds. Production was still cutting 6 per cent at last reports but may clean up. Petroleum Securities may drill an offset to this deep well if it holds up, as its Hartman lease adjoins that held by Tide Water Associated Oil Co. In the Hopper Canyon district of Ventura County, Skyline Oil Co. completed No. 1 Hadley, pumping 80 bbls. of 29.8-gravity oil per day from 2,747 feet after finishing the hole with a 5¾-inch string carrying 577 feet of perforated landed on bottom.

El Segundo

In the El Segundo field of Los Angeles Basin, Apex Petroleum Corp. No. 1 Converse was finished flowing 1,130 bbls. of clean 27.3-gravity oil through a 1-inch bean under a tubing pressure of 150 pounds and a casing pressure of 840 pounds. No. 1 Converse was bottomed in the basement Schist at 7,408 feet and finished with 462 feet of 4¾-inch liner including 429 feet of perforated landed at 7,407 feet. Standard Oil Co. completed No. 8 Refinery pumping 145 bbls. of 24.6-gravity oil per day from 7,273 feet and will prob-

(Continued on Page 92)

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	February 18		February 11			
Intercoastal-domestic—	Total this week	Daily average	Total last week	Daily average	This week to date	Same time last year
Diesel and gas oil	.....	.....	.....	.....	.....	176,726
Gasoline	.....	.....	80,512	11,502	344,116	194,946
Kerosene	.....	.....	.....	.....	59,885	.....
Foreign exports—						
Crude oil	383,523	54,789	67,093	9,585	2,564,149	914,717
Fuel oil	45,981	6,569	138,741	19,820	604,562	1,868,863
Diesel and gas oil	.....	.....	105,552	15,079	432,985	1,074,736
Gasoline	.....	.....	370,094	52,871	793,572	596,229
Kerosene	.....	.....	25,749	3,678	147,775	569,785
Coastwise-domestic—						
Crude oil	211,629	30,233	195,009	27,858	1,214,831	929,651
Fuel oil	98,614	14,088	221,582	31,655	1,776,356	1,853,908
Diesel and gas oil	30,723	4,389	37,322	5,332	231,148	251,880
Gasoline	112,639	16,091	171,591	24,513	1,805,497	1,590,625
Kerosene	13,902	1,986	1,781	254	42,756	13,835

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—						
Diesel and gas oil	.....	.....	.....	.....	178,662	75,895
Foreign exports—						
Crude oil	244,358	34,908	.....	.....	580,527	388,489
Fuel oil	48,965	6,995	26,654	3,808	101,650	188,107
Diesel and gas oil	.....	.....	20,027	2,861	118,920	322,233
Gasoline	.....	.....	166,929	23,847	305,402	765,563
Kerosene	.....	.....	15,172	2,167	85,841	115,972
Lubricants	.....	.....	.....	.....	.....	106,280
Coastwise-domestic—						
Fuel oil	81,749	11,678	91,411	13,059	905,456	905,754
Diesel and gas oil	89,331	12,762	18,953	2,708	301,952	58,124
Gasoline	74,112	10,587	102,606	14,658	954,565	643,684
Kerosene	20,945	2,992	14,315	2,045	134,936	3,367

STANDARD OIL CO. OF CALIFORNIA AND UNION OIL CO

Crude oil prices at the well effective June 22, 1936

Gravity—	Signal Hill (Long Beach)	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda-Brea Canyon	Athens-Rosecrans	Dominguez	Elwood Terrace	Torrance	Richfield	Whittier E. Coyote (La Habra)	Montebello	W. Coyote Hills	Santa Fe Springs	Mountain View	Elk Hills Buena Vista Hills Midway-Sunset Lakeview Area	Lost Hills	Coalinga	Wheeler Ridge	Kettleman Hills	Santa Paula*	Orcutt*
14-14.9	$.80	$.79	$.74	$.78	$.79	$.80	$.76	...	...	...	$.80	$.76	$.76	$.77	$.78	...	...	$.70	$.70	$.70	...	...	$.70	...
15-15.9	.80	.79	.74	.78	.79	.80	.76	...	...	...	.80	.76	.76	.77	.78	...	...	.70	.70	.70	...	...	.70	...
16-16.9	.80	.79	.74	.78	.79	.80	.76	...	...	...	.80	.76	.76	.77	.78	...	...	.70	.70	.70	...	...	.70	$.70
17-17.9	.80	.79	.74	.78	.81	.80	.76	...	...	...	.80	.76	.76	.77	.78	...	...	.70	.70	.70	...	...	.71	.70
18-18.9	.80	.79	.74	.78	.84	.80	.78	...	...	...	.82	.76	.76	.77	.78	...	...	.70	.70	.70	...	...	.73	.72
19-19.9	.82	.79	.74	.82	.87	.84	.81	...	...	...	.85	.76	.78	.77	.78	...	$.70	.74	.74	.71	$.70	...	.75	.74
20-20.9	.85	.79	.74	.85	.90	.88	.84	...	...	...	.88	.78	.82	.77	.80	...	.70	.78	.78	.72	.70	...	.77	.77
21-21.9	.88	.79	.74	.89	.93	.93	.88	...	...	...	.91	.80	.85	.77	.84	$.78	.73	.82	.82	.74	.70	...	.79	.80
22-22.9	.92	.82	.74	.92	.96	.98	.92	...	...	...	.93	.84	.89	.79	.88	.78	.77	.87	.86	.78	.72	...	.82	.83
23-23.9	.95	.86	.77	.96	.99	1.02	.96	$.84	$.79	...	.96	.88	.93	.82	.92	.78	.80	.92	.90	.82	.76	...	.85	.86
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	...	.99	.91	.96	.85	.96	.82	.84	.97	.94	.86	.79	...	.87	.88
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	...	1.02	.95	...	.89	.99	.86	.88	1.01	.98	.90	.83	...	.90	.91
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	...	1.05	.98	...	.92	1.03	.90	.91	1.06	1.02	...	...	...	.92	.93
27-27.9	1.10	1.05	.88	1.11	1.12	...	1.10	1.03	.88	...	...	1.02	...	.96	1.06	.95	.95	1.10	1.06	...	...	...	.95	...
28-28.9	1.14	1.10	.90	1.14	1.15	...	1.14	1.07	.90	...	...	1.06	...	.99	1.10	.99	.99	1.15	1.10	...	...	...	.97	...
29-29.9	1.17	1.15	.93	1.18	1.18	F.O.B.	1.17	1.12	.93	...	...	1.09	...	1.03	1.14	1.03	1.02	1.20	1.14	...	...	...	.99	...
30-30.9	1.21	1.19	.95	1.22	1.21	our	1.21	1.17	.95	F.O.B.	...	...	...	1.07	1.17	1.08	1.06	1.25	1.18	...	...	...	1.01	...
31-31.9	...	...	...	...	1.24	Pipe	1.24	1.22	.97	Ship	...	...	...	1.11	1.21	1.12	1.09	1.29	...	...	...	...	...	...
32-32.9	...	...	...	...	1.27	Line	1.27	1.27	1.00	...	...	...	...	1.14	1.25	1.16	1.13	1.34	...	...	...	...	...	...
33-33.9	...	...	...	...	...	...	...	1.32	...	$1.28	...	...	...	1.18	1.28	1.20	1.17	1.38	...	...	...	$1.19	...	...
34-34.9	...	...	...	...	...	...	...	1.37	...	1.32	...	...	...	1.22	1.32	1.25	1.20	...	...	...	...	1.23	...	...
35-35.9	...	...	...	...	...	...	...	1.42	...	1.35	...	...	...	1.25	...	1.29	...	...	...	...	...	1.27	...	...
36-36.9	...	...	...	...	...	...	...	1.46	...	1.39	...	...	...	1.29	...	1.33	...	...	...	...	...	1.31	...	...
37-37.9	...	...	...	...	...	...	...	1.51	...	1.43	...	...	...	1.32	...	1.37	...	...	...	...	...	1.35	...	...
38-38.9	...	...	...	...	...	...	...	1.56	...	...	...	...	...	1.36	...	1.42	...	...	...	...	...	1.39	...	...
39-39.9	...	...	...	...	...	...	...	1.61	...	...	...	...	...	1.40	...	...	...	...	...	...	...	1.43	...	...
40-40.9	...	...	...	...	...	...	...	1.66	...	...	...	...	...	1.43	...	...	...	...	...	...	...	...	...	...

Newhall, McKittrick, Kern River, Kern Front and Round Mountain, 70 cents for all grades. *Posted by Union Oil Co. Same company's Brea Canyon schedule stops at $1.14 for 28 degrees and over, and Belridge and Lost Hills schedule stops at $1.32 for 37 degrees and over. By Standard Oil Co., effective October 15: El Segundo, 14 to 18.9 degrees, 80 cents; 19-19.9, 82 cents; 20-20.9, 85 cents; 21-21.9, 88 cents; 22-22.9, 92 cents; 23-23.9, 95 cents; 24-24.9, 99 cents; 25-25.9, $1.03; 26-26.9, $1.06; 27-27.9, $1.10; 28-28.9, $1.14; 29-29.9, $1.17; 30-30.9, $1.21. Wilmington, 14 to 16.9, 75 cents; 17-17.9, 77 cents; 18-18.9, 79 cents; from 19 degrees upward, prices same as Signal Hill.

Oklahoma Operations

By DAL DALRYMPLE

Three Big Ramsey Producers; Work Starts at Nearby Tests

The new Ramsey pool southwest of Stillwater in Payne County was practically the whole show in Oklahoma fields the past week, with three offsets to the discovery well being completed as large producers. With completion of the four wells on the community block owned by Mid-Continent Petroleum Corp. and associates, interest veers to tests offsetting the block on the south and west.

These are J. E. Crosbie, Inc. No. 1 Houston, SE SE NW section 13-18-1e; same operator's No. 2 Houston, NE SE NW section 13-18-1e, and E. H. Moore, Inc. No. 1 Boyd, NE cor. section 24-18-1e. These locations are one-half mile from the producers. Other tests in the general area are Helmerich & Payne and others No. 1 Ritchey, C NE NW section 34-18-1e, and Big Chief Drilling Co. and others No. 1 Moore, SE SW NW section 17-18-1e.

Mid-Continent Petroleum Corp. and others No. 1 Carl Wetzel, NE NE SE section 13-18-1e, diagonal southwest offset to the discovery, was washed in last Saturday, flowing 487 bbls. of 43-gravity oil the first hour, and 464, 461 and 467 bbls. the next three hours, respectively, a total of 1,879 bbls. in the four hours. Gas was estimated at 4,000,000 feet. Wilcox sand was topped at 4,762 feet, total depth 4,788 feet.

The same operators' No. 1 Columbia Wetzel, NW NW SW section 18-18-2e, completed earlier in the week, flowed 450 bbls. of oil the first hour and a total of 1,958 bbls. in four hours. It topped Wilcox sand at 4,780 feet. The No. 1 Brandon, SE SE NE section 13-18-1e, was the second completion in the pool. Others interested in the community block with the Mid-Continent company are Carter Oil Co., Sinclair Prairie Oil Co. and Transwestern Oil Co.

Harry Hollenbach and others were moving in tanks and connections at No. 1 Clark, NW cor. 34-21-6w, pool opener southeast of Waukomis in Garfield County. It showed for 300 to 500 bbls. of oil daily from Marshall sand at 7,260-80 feet.

Texas Co. was rigging up tools to deepen No. 1 Cathey, SE NE NE section 6-5s-1w, southeast of the Hewitt field in Carter County. This wildcat was drilled to 4,559 feet, plugged back to 4,410 feet, and has been producing about 10 bbls. of oil daily since 1936. The company also has announced location for No. 1 Dolman, SE SW NW section 6-5s-1w, which is to go to Ordovician zone or 7,000 feet.

Payne County

The second well to be completed in the new Ramsey pool, near Stillwater in Payne County, was Mid-Continent Petroleum Corp. and others No. 1 Brandon, SE SE NE section 13-18-1e. It was washed in, flowing 500 bbls. of oil the first hour, and 479, 463 and 484 bbls. of oil in the next three hours, respectively. It was estimated good for 11,400 bbls. of 42.4-gravity oil daily, with 5,000,000 feet of gas. Wells in the Ramsey pool are allowed to produce 100 bbls. of oil daily.

Three tests on leases offsetting the Ramsey community block were announced. E. H. Moore and associates No. 1 Boyd, NE cor. section 24-18-1e, was digging cellar and pouring rig corners. J. E. Crosbie, Inc., No. 1 Houston, SE SE NW section 13-18-1e, was digging cellar. Same operator's No. 2 Houston, NE SE NW section 13-18-1e, was a location.

Wildcat Completions

Indian Territory Illuminating Oil Co. and others No. 1-A Dome-bo, C NE SE section 29-6-10w, wildcat south of Anadarko and west of the Cement field in Caddo County, was dry and abandoned at 6,900 feet, total depth. Casing was perforated and the well was shot to test shows of oil in upper horizons, but salt water intruded at the rate of 13 to 15 bbls. an hour.

Two shallow wildcat tests in northeastern Stephens County were abandoned. They were Henry & Schwoerke No. 1-A Sadler, NW NW SE section 30-2n-4w, at 580 feet, total depth, and Robinson and others No. 1 Alexander, NE NW SE section 30-2n-4w, at total depth of 380 feet.

A wildcat completion of the preceding week was Hall-Troup & Moore No. 1-A Brinlee, SW SW NE section 27-6-5, near Konawa in southwestern Seminole County. It had estimated production of 8,500,000 feet of gas from Calvin sand at 2,298-2,325 feet, total depth.

Dutton and others No. 1-B Peters, SW NW SE section 8-6-10, Seminole County wildcat, was dry and abandoned at 652 feet, total depth.

H. Riddle and others No. 1 fee, NW SW SE section 11-3-5, Pontotoc County wildcat, was dry and abandoned at 4,490 feet, total depth.

Pontotoc County

Continental Oil Co. No. 5 Thompson, SW SW NE section 2-1n-7, Jesse area, topped Hunton lime at 3,841 feet, Sylvan shale 4,129 feet, and was bottomed at 4,132 feet. It was acidized, flowed 255 bbls. of oil in four hours and was completed for estimated potential of 1,200 bbls. of oil.

J. F. Lloyd No. 2 Wesley, NW NE NW section 7-3n-7, had salt water in the hole and was abandoned at 1,200 feet, total depth.

Vierson Oil & Gas Co. No. 2-A Factor, SW NE SW section 25-5-7, was dry and abandoned at 1,231 feet, total depth, with 600 feet of water in the hole.

Westheimer & Neustadt No. 2-A Factor, NW SE SW section 25-5-7, had drillers' top of Hunton lime at 3,870 feet and was dry and abandoned at 4,032 feet.

Loual Drilling Co. and others No. 4-A Hardin, NE SW NW section 30-2-7, Fitts district, an old well, was plugged back from 3,720 feet, total depth, to 2,812 feet, was shot and flowed 125 bbls. of oil daily, recompleted.

E. H. Moore No. 6 Harper, SE NW NE section 29-2-7, an old well, was plugged back from 4,364 feet to 4,296 feet, pumped 33 bbls. of oil and 73 bbls. of water daily and was recompleted.

Other recent completions in Pontotoc County: Magnolia Petroleum Co. No. 7 Norris, SW NE NE section 21-2n-7, Fitts sector, had initial yield of 1,196 bbls. of oil daily from Hunton lime at 3,957 feet, total depth 3,964 feet.

E. H. Moore No. 12-A Schauers, C E half SE NE NW section 29-2-7, an old well, was plugged back from 4,355 feet to 4,330 feet, and recompleted for 31 bbls. of oil daily. Same operator's No. 4 Woodruff, NW NW SE section 29-2n-7, an old well, was recompleted for 90 bbls. of oil daily after plugging back to 4,265 feet from 4,403 feet. Carter Oil Co. No. 12 Smith, NE NE SW section 28-2-7, pumped 6 bbls. of oil daily after plugging back from 3,470 feet to 2,849 feet.

Loual Drilling Co. and others No. 2-A Hardin, SE SW NW section 30-2-7, was plugged back from 3,650 feet to 2,700 feet, and recompleted for 250 bbls. of oil daily. Top of Cromwell sand was 2,500 feet.

Magnolia Petroleum Co. No. 3 Mayhue, NE SE SE section 20-2-6, was dry and abandoned at 3,280 feet, total depth.

J. E. Crosbie, Inc., No. 1-B Harden, SW SW NE section 30-2-7, an old well, was cleaning out after setting plug at 2,200 feet and shooting. J. R. Harris No. 2 Rives, SW NE NW section 6-3n-7, East Ada sector, was a rig.

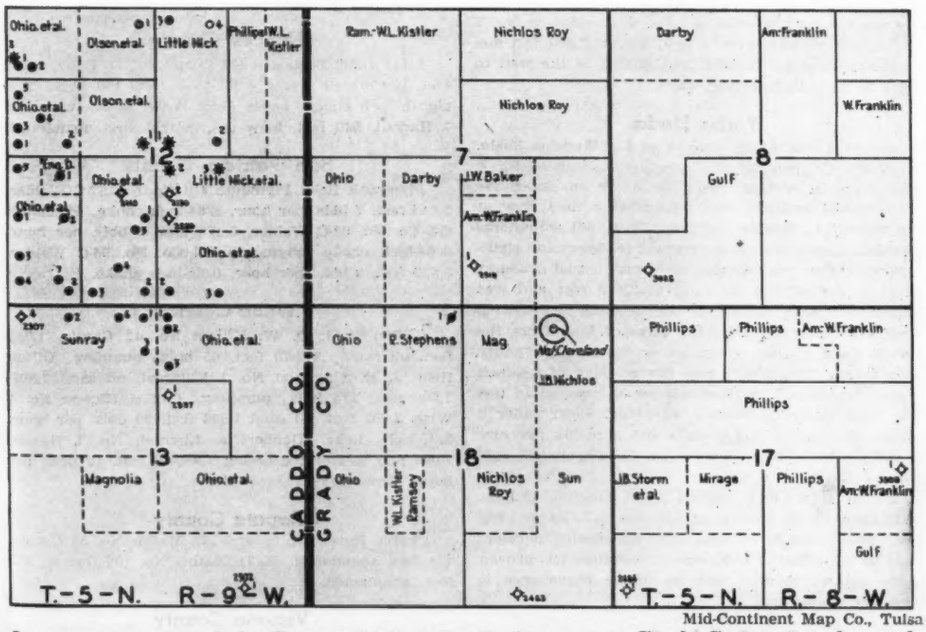
Seminole County

Largest producer of four wells completed in Seminole County was Amerada Petroleum Corp. and others No. 4 Klabzuba, SW SE SE section 35-11-5. It had Wilcox sand at 4,648 feet, total depth 4,653 feet, swabbed 127 bbls. of oil in six hours and was completed for 508 bbls. of oil in 24 hours.

J. F. Smith No. 2 Austin, SE NE SE section 32-7-6, had Boggy sand at 2,857 feet, total depth 2,913 feet, was shot and flowed 250 bbls. of 37-gravity oil in 24 hours.

Texas Co. No. 4 Jefferson, SW NE NE section 26-5-7, found Hunton lime at 3,847 feet, Sylvan shale 3,887 feet, total depth 3,905 feet, and flowed 53 bbls. of oil in 24 hours through choke.

Magnolia Petroleum Co. No. 1 Fleet-Osborne, NW SE NE section 26-5-7, was acidized and pumped 73 bbls. of



Mid-Continent Map Co., Tulsa

An attempt to extend the Cement field of Caddo County into Grady County is to be made by J. B. Nichlos in section 18-5n-8w

oil in 24 hours. Top of Hunton lime was 3,829 feet, total depth 3,942 feet.

Gulf Oil Corp. No. 4 Peter, SW NE NE section 23-5-7, an old well, was plugged back from 4,250 feet to 4,149 feet, shot and acidized and pumped 117 bbls. of oil in 24 hours, recompleted.

New work in Seminole County: D. B. Malarnee No. 3 Shelton, NW NW SW section 33-7-6, location; same operator's No. 4 Shelton, SW SW NW section 33-7-6, location; R. Lillard and others No. 1-A Barker, NW NW NE section 12-9-5, rig; Myers & Halko No. 1 Berrio, SE SE NW section 15-10-6, drilling at 480 feet.

Pottawatomie County

Magnolia Petroleum Co. No. 5 Banta, SW SE SE section 14-7-4, St. Louis pool, Pottawatomie County, swabbed and flowed 170 bbls. of 43-gravity oil in 24 hours and was completed at 3,143 feet, total depth. Calvin sand was topped at 3,134 feet.

Magnolia Petroleum Co. No. 3 Green, SE SW NW section 13-7-4, was a completion of the preceding week. It was bottomed at 3,132 feet, plugged back to Calvin sand at 3,107-20 feet, and completed for 50 bbls. of oil daily.

Phillips Petroleum Co. No. 4 Pappan, SE cor. section 16-7-4, was a location. Same company's No. 4 Pried, NW NE NE section 23-7-4, was a location.

Oklahoma County

Indian Territory Illuminating Oil Co. No. 4 Fuzzell, SW SW NW section 19-11-2w, Oklahoma City field, Oklahoma County, was bottomed at 4,455 feet, plugged back to 3,990 feet, perforated casing and produced 2,125,000 feet of gas.

Coal County

Carter Oil Co. and Gulf Oil Corp. No. 1 Buck, C E half SE SW section 6-1n-8, Coal County sector of the Jesse area, an old well, was deepened from 4,002 feet to 4,276 feet and recompleted for 110 bbls. of oil daily.

Atoka County

I. B. McGill No. 5 Gilbreath, C E half NE SW SE section 5-1n-15, northeastern Atoka County, was dry and abandoned at 330 feet, total depth.

Carter County

Magnolia Petroleum Co. No. 14 Thompson, SE NE NW section 9-4s-3w, Healdton field, Carter County, was bottomed at 1,092 feet, plugged back to 1,005 feet, and pumped 5 bbls. of oil daily.

F. W. Merrick, Inc., No. 2 Mitchell, SE NW SE section 24-1s-3w, Tatum pool, was abandoned at 1,620 feet in shale.

Magnolia Petroleum Co. No. 74 Richards, NE NE NW section 6-4s-3w, an old well, was completed for 52 bbls. of oil and 11 bbls. of water daily after plugging back from 1,153 feet to 1,136 feet.

Kewanee Oil & Gas Co. No. 37 Jones, SE SE NW section 4-4s-3w, an old well, was bottomed at 3,205 feet, plugged back to 2,620 feet, and recompleted, producing 500,000 feet of gas daily.

Sinclair Prairie Oil Co. No. 31 Ardworth, NE NW NW section 10-4s-3w, was digging pits.

Grady County

T. H. McCasland No. 5 Horton, SW NE NW section 8-3n-5w, Knox pool, Grady County, had sand at 1,992-2,008 feet, total depth 2,857 feet. It was plugged back to 2,008 feet, pumped 25 bbls. of oil daily and was completed.

Caddo County

J. B. Nichlos No. 3 Royce, NW NW NE section 12-5-9w, Cement field, Caddo County, had a junked hole and was abandoned at 6,404 feet, total depth. This well was started in November, 1936, and experienced numerous drilling difficulties. Several showings of oil and gas were reported.

Ray Stephens, Inc., No. 3 Melton, NE NW SE section 26-6-10w, is location for a new test in the Cement pool.

Additional New Work

In Kay County, J. R. Pierse No. 1 Harman, SE cor. section 26-28-2e, wildcat, was underreaming 12-inch casing, total depth 630 feet.

In Osage County, Indian Territory Illuminating Oil Co. No. 3 well, NE NW SW section 26-25-9, an old well, was plugged back from 2,155 feet to 1,751 feet and recompleted for 1,210,000 feet of gas. C. R. Oakleaf No. 152 Osage, SW NW NE section 34-29-10, an old well bottomed at 1,708 feet in Mississippi lime, was rigging up to deepen.

In Garvin County, Simpson-Fell Oil Co. No. 11 Derdeyn, C E half SW NW section 17-1n-3w, Robberson pool, had dug pits.

In Stephens County, J. G. Beard No. 4 Willis, CSL SE SW section 23-2s-6w, Woolsey pool, was a location.

In Hughes County, Amerada Petroleum Corp. and Stanolind Oil & Gas Co. No. 1 Martin, NW NE NE section 6-9-9, wildcat, had dug cellar. It is to be a Wilcox sand test.

In Okmulgee County, Francis Corp. No. 2-A Massingale, NE NE NW section 23-15-14, was a rig.

In Muskogee County, Howard & Holofield No. 1-B Howard, NW NW SW section 33-15-15, was a location.

In Okfuskee County, J. O. Hayes and associates No. 2 Huldy Deer, SW NE NW section 28-10-11, was a location.

Estimated Daily Production

Estimated daily production of Oklahoma for the week ending February 26, and for the preceding week, was as follows:

	Barrels	
	Feb. 26	Feb. 19
Allen	5,600	5,725
Billings	7,450	7,375
Burbank	7,475	7,600
South Burbank	8,750	13,200
Balance Osage	18,750	19,750
Blackwell district	5,025	5,200
Bristow-Slick	6,900	6,950
Chandler	2,200	2,275
Crescent	7,700	8,175
Cromwell	3,025	3,350
Cushing-Shamrock	10,400	10,600
Duncan district	3,625	3,850
Edmond	7,800	10,400
Fish	3,925	4,475
Fitts	58,275	65,025
Jesse	2,550	3,525
Graham	5,500	5,600
Gray	1,100	1,150
Healdton	9,125	9,300
Hewitt	4,000	4,025
Holdenville	775	800
Keokuk	7,125	8,400
Konawa	1,150	1,575
Lucien	12,200	11,700
Moore	7,475	8,350
Oklahoma City	101,975	117,200
Olympic	5,975	6,475
Polo	725	750
Sasakwa and townsite	2,275	2,400
Sholem-Alechem	2,850	2,950
Seminole district:		
Bowlegs	10,150	10,200
Carr City	4,375	4,450
Earlsboro	5,325	5,925
South Earlsboro	550	625
East Earlsboro	5,825	5,925
Little River	8,650	9,725
East Little River	950	1,050
Maud	825	725
Mission	1,775	1,850
Seminole	8,500	8,550
East Seminole	1,875	1,900
Searight	3,725	3,675
Total Seminole	52,525	54,600
St. Louis-Pearson	17,700	18,600
Tatums	6,500	6,875
Tonkawa-Garber-Thomas	4,250	4,400
Wewoka	2,375	2,750
Yale-Jennings	3,625	3,775
Other pools	82,900	83,150
Total Oklahoma	491,575	532,300

California Fields

(Continued from Page 90)

ably suspend further development work in this field for the present. Wilshire Oil Co. is abandoning No. 1 El Segundo Construction, a dry hole, at 7,400 feet due to the unfavorable outlook and failure of the well to react to several formation tests.

Yorba Linda

In the Yorba Linda district of Los Angeles Basin, Shell Oil Co. completed a production test of its E core hole in section 16-3-9 in order to determine its potential and the well responded with a flow at the rate of 1,150 bbls. per day. This well which was spudded in as a core hole prospect to determine structural conditions was finished as a commercial producer when it drilled into oil sand at 2,460 feet and was finally finished at 2,313 feet. On the basis of this well, Shell Oil Co. purchased 2,797 acres of land from the Olinda Land Co. on which an option had previously been taken. The E core hole has a string of 8⅝-inch casing landed at 2,191 feet and on its production test this week flowed through a 44/64-inch bean under a tubing pressure of 150 pounds and a casing pressure of 500 pounds. The well was shut in immediately subsequent to the potential test. F. E. Fairfield completed No. 1 Dutton in section 22-3-9 pumping 75 bbls. of 15.2-gravity oil cutting 40 per cent daily from 1,662 feet. The Yorba Linda area now undergoing development by a number of independent operators has proven to be rather "spotty" and its future importance is therefore conjectural.

Los Angeles Basin

In the Torrance field, Neal H. Anderson, former oil umpire for California, completed his No. 2 Torrance pumping 175 bbls. of 26.9-gravity oil per day from 5,050 feet after the well had been redrilled and deepened from the upper zone. This well was finished with a full string of 6⅝-inch casing landed on bottom and then gun perforated from 4,980 feet to 5,035 feet. There are 26 wells either actually headed down to the deep pay or being prepared to get under way within another few days. This zone is not a prolific producer and should not therefore cause any great affect on state production of crude oil. In the Richfield district, Union Oil Co. completed No. 29 Chapman pumping 150 bbls. of 21.3-gravity oil per day from 4,610 feet after the hole had been carried down to 10,496 feet as a deep test and then plugged back to the completion depth.

San Joaquin Basin

Chanslor Canfield Midway Oil Co. completed a small well in the Midway-Sunset field of Kern County when No. 76 in section 6-32-23 was brought in pumping 15 bbls. of 14.3-gravity oil cutting 20 per cent. Richfield Oil Corp. No. 1 Main Camp at 2,560 feet should begin making a production test within a few days as the hole has been finished with 82 feet of 7-inch liner including 70 feet of perforated landed on bottom. In the South Belridge field, Chico-Martinez Oil Co. completed No. 1 Exeter in section 1-29-20 pumping 51 bbls. of 12.3-gravity oil per day from 1,029 feet after the hole had been carried down to 1,066 feet and then plugged back to the completion depth.

Southwest Texas Fields

(Continued from Page 85)

Duval County

Benavides field: Republic Production Co. No. 3 Buoy, 4,790 feet, 81 bbls., one-eighth inch choke. Southwood Oil Co., Inc., No. 4 Rossi, 5,350 feet, 200 bbls., quarter-inch choke. Hoffman field: Cox & Hamon No. 6 Hoffman, 2,671 feet, 25 bbls., jetting. Labbee field: Humble Oil & Refining Co. No. 1 Murphy, 2,798 feet, abandoned. Lundell field: Government Wells Oil Co. No. 16 Lundell, oil sand 1,500-09 feet, 10 bbls. per hour, three-eighths inch choke. Peters field: G. G. Mortimer No. 1-C Peters, 1,850 feet, abandoned.

Hidalgo County

Samfordyce field: Graham & Kingwood Oil Co. No. 2 Yturri Land & Cattle Co., 3,058 feet, perforated casing 3,008-14½ feet, 300 bbls. fluid, 65 per cent salt water.

Karnes County

South Burnell field: Luling Oil & Gas Co. No. 21 Boyce, 3,674 feet, 126 bbls., three-sixteenths inch choke.

Kleberg County

Kingsville field: Clark & Stelzig No. 1 Wilkenson, 1,548 feet, abandoned.

Nueces County

Luby field: Seaboard Oil Corp. No. 11 Luby, 4,353 feet, perforated casing 4,342-45½ feet, 130 bbls., one-eighth inch choke. Saxet field: Potter & Snowden No. 1 Harrell, 840 feet, blew out, caught fire, abandoned.

San Patricio County

Plymouth field: Plymouth Oil Co. No. 92-C Welder, 5,645 feet, 7 bbls. per hour, 9/64-inch choke. Plymouth Oil Co. No. 93-C Welder, 5,479 feet, 8 bbls. per hour, 9/64-inch choke. Plymouth Oil Co. No. 94-C Welder, 5,632 feet, 9 bbls. per hour, 9/64-inch choke.

Webb County

Killam field: O. W. Killam No. 41 Garcia, 1,982 feet, oil sand 1,972-75 feet, 65 bbls., pumping. Oilton field: J. M. Singleton No. 1 Villareal, oil sand 1,897-1,909 feet, 175 bbls., pumping. Cox & Hamon No. 4 Wise, 2,001 feet, oil sand 1,993 feet, 20 bbls. per hour, half-inch choke. Daubert & Liscomb No. 1 Garcia, 2,006 feet, perforated casing 1,983-88 feet, 12 bbls. per hour, three-eighths inch choke.

Zapata County

Charco Rendondo field: E. D. Mathis No. 55 Garcia, 471 feet, abandoned. E. D. Mathis No. 108 Garcia, 255 feet, abandoned.

Victoria County

Hughes field: Portilla Drilling Co. No. 1-A Welder, 6,168 feet, abandoned.

West, Central and Panhandle Texas

By MITCHELL TUCKER

Southwestern Callahan Has 1,500-Bbl. Ordovician Well

FORT WORTH, Tex., Feb. 28.—The interest in Ordovician possibilities in West Texas was shifted quickly last week from the southern portion of the Permian Basin to West Central Texas, where a 1,500-bbl. producer is in the completion stages in the Oplin area of southwestern Callahan County, 10 miles southeast of Abilene.

The Oplin structure was first discovered in October, 1926, when H. H. Adams, geologist of Abilene, Tex., completed No. 1 Windham as a gas well in a 20-foot sand which is still productive. In 1934 a deep test was drilled to 4,489 feet by Drew Beans and Adams, which encountered heavy flows of gas and oil but was junked due to mechanical difficulties. Hal Hughes and associates from New York and California, assembled a block and drilled No. 1 Poindexter, section 350, George Hancock Survey, to its present total depth of 4,389 feet. First oil and gas was found at 4,369 feet in what is believed to be the Simpson section of middle Ordovician. Following a 3,000-gallon acid charge, the well began flowing a solid stream of oil through 2-inch tubing for a two-hour testing period before being shut in. The well showed no decrease when reopened 18 hours later and in 30 minutes built up a tubing pressure of 875 pounds. Hughes and associates hold an 8,000-acre block surrounding this Oplin discovery, and plan an immediate development campaign.

Snyder Field Extension

Western limits of the Snyder field of Howard County were thrown open again by the completion of Iron Mountain Oil Co. No. 4 Snyder for an initial production of 300 bbls. hourly following a 720-quart shot at 2,590-2,765 feet. The pay section was topped over 60 feet higher than other wells in that portion of the field. Four other wells are to be spudded in immediately. Cosden Pipe Line Corp. is extending its line from the East Howard pool to the new Snyder production to provide that field another outlet.

North Permian Basin

The northern portion of the expanding Wasson field (formerly called the Denver field) in southern Yoakum County appears to have a 1½-mile eastward extension. Shell Petroleum Corp. No. 1-C Baumgart flowed an unestimated amount of oil into pits to indicate the field's expansion in that direction. About 200 feet of lime section was drilled, showing good saturation in streaks but low porosity. A 600-quart shot from 4,810 to 5,018 feet, total depth, caused the well to flow and clean itself until it bridged over. The Shell Co. is staking two other semiwildcat outposts in this territory in an effort to prove up their extensive holdings there.

Seminole Field

As the sixth producer in the Seminole field of Gaines County, and its largest producer, Ohio Oil Co. No. 2 Mrs. Sarah J. Averitt, extended production one-half mile southwest by flowing 345 bbls. in eight hours through open 2½-inch tubing following a 1,000-gallon acid charge, total depth 5,089 feet. Amerada Petroleum Co. No. 1 R. W. Robertson is a probable 1-mile eastern extension to Seminole production, but is now fishing for tools at a total depth of 5,112 feet.

Hockley Field

Official gauge is now being taken on the Slaughter field's 2½-mile northward extension in southern Hockley County. S. W. Richardson No. 1 Slaughter is testing through 2½-inch tubing set at 4,985 feet. After flowing into the pits a few minutes, production was turned into tanks and gauged 50 bbls. the first hour and 20 bbls. the second hour. Gulf Oil Corp. will drill plugs and test its important southeast and southwest outpost tests to this field next week.

Central Basin Activity

Twelve new locations were made in the Goldsmith pool in Ector County, which now includes the formerly designated Cummings, Scarborough, and Goldsmith areas. Two were made by Texas Pacific Coal & Oil Co., three by Humble, three by Gulf, and four on the joint Phillips-Pure properties. All were in proven territory except Gulf No. 80 Goldsmith which is staked upon a heretofore untested section (No. 9) of the T.&P. Survey.

Harper Pool Hearing

A formal hearing was held before the Texas Railroad Commission in Fort Worth on future development plans and means of allocating production in the Harper field in Ector County. Heretofore all but three wells in the field have been drilled on 10-acre patterns. There are now 44 producing wells and 20 drilling wells in the field. It was proposed by some to invoke a 20-acre spacing rule, and place the allocation of production between wells on a 25 per cent acreage and 75 per cent potential basis. The petition was opposed by a group who offered testimony that there was no interference or communication between wells on 10-acre spacing, and that a wider pattern would not adequately drain the reservoir. The provisions in the order which may grow out of this hearing was not indicated by commission officials.

South Ward Discovery

Indicating a new producing structure in southern Ward County just north of the Pecos River, Patillo & Webster No. 1 Johnson is flowing by heads at the rate of about 50 bbls. daily from a sand at 1,935-60 feet. Location is in the H.&T.C. Survey about 5 miles south of Grand Falls. Testing will continue here.

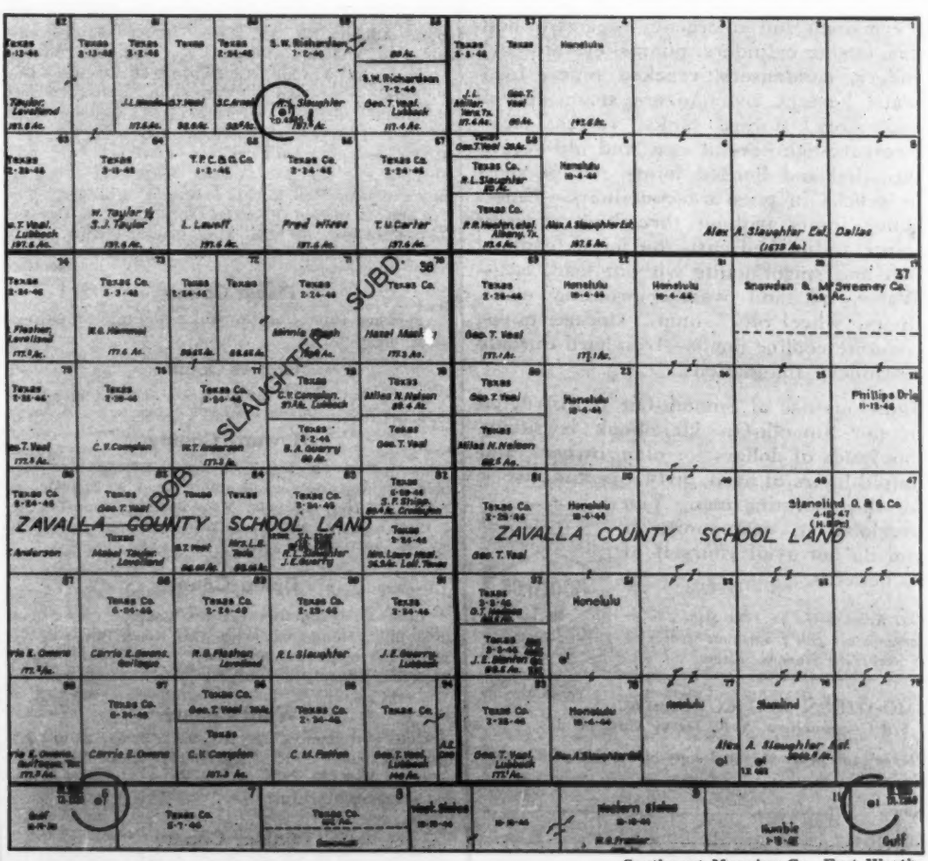
WEST CENTRAL TEXAS

A shallow lime pool in southern Jones County is in prospect. Two Oklahoma City operators, Walter K. and R. D. Jones No. 1 Ora Neas drilled a 10-foot saturated section of lower Hope lime at 1,953-63 feet and after a 3,000-gallon acid charge flowed and swabbed at the rate of 100 bbls. daily. Location is 5 miles east of the town of Hawley in the D. Bustillos Survey.

Wittmer Oil & Gas Properties, Inc., of Pittsburgh announced location for a 4,500-foot Ellenburger wildcat in northeastern Callahan County, 2 miles northeast of Putnam. The company's 5,000-acre block is centered around the Putnam "grassroots" field in the T.E.&L. Survey.

PANHANDLE

Severe weather conditions over the last few weeks



Southwest Mapping Co., Fort Worth

Slaughter field of southern Hockley County. Circled wells show areal extent of outpost activity. To the north, S. W. Richardson is completing an important extension, while southeast and southwest Gulf Oil Corp. is preparing to test two outposts after setting casing

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in the Panhandle served to reduce the number of completions, and last week only 12 were made. The nine new oil wells had an aggregate potential of 4,219 bbls., and the two gas wells 50,000,000 feet. One Gray County well was dry.

PANHANDLE COMPLETIONS

(24-hour gauges)

Carson County

Danciger Oil & Refining Co. No. 4 Block, 2,995-3,105 feet, 49,868,000 feet of gas.

Gray County

Cambrian Oil Co. No. 8 Barrett, 3,190-3,280 feet, 282 bbls. Cities Service Oil Co. No. 6 Noel, 3,142-3,275 feet, 650 bbls.; No. 6 Walberg, 3,034-85 feet, 565 bbls. Magnolia Petroleum Co. No. 9 Haggard, 3,242-74 feet, 278 bbls. Stekoll Oil Co. No. 2 Combs-Worley A, dry and abandoned at 3,150 feet.

Hutchinson County

Alma Oil Co. No. 2 Whittenburg, 2,950-3,018 feet, 527 bbls. Cree-Hoover & Dye No. 2 Harvey, 2,985-3,041 feet, 632 bbls. Gulf Oil Corp. No. 78 Dial, 2,964-95 feet, 420 bbls. Smith Brothers No. 2 Hughes, 3,005-91 feet, 633 bbls. Stekoll & Dye No. 1 Carver-Whittenburg, 2,910-3,205 feet, 43,000,000 feet of gas.

Moore County

Phillips Petroleum Co. No. 1 Shellburg, 3,095-3,230 feet, 6,868,000 feet of gas.

WEST TEXAS COMPLETIONS

(24-hour gauges)

Crane County

Gulf Petroleum Corp. No. 168 McElroy, 2,700-2,906 feet, 869 bbls. Quality Producing No. 2 Howard, 2,212-2,324 feet, 324 bbls.

Culberson County

Eollins & Brewer No. 1 Caldwell, dry and abandoned at 2,185 feet.

Ector County

Amerada No. 1 Cummings, 4,160-4,249 feet, 721 bbls. Atlantic No. 3-C Rumsy, 4,180-4,285 feet, 619 bbls; No. 5 Slator, 4,180-4,303 feet, 143 bbls. Bond & Harrison No. 3 Addis, 3,897-4,070 feet, 135 bbls. Gulf Petroleum Corp. No. 70 Goldsmith, 4,130-4,205 feet, 1,180 bbls. Magnolia Petroleum Co. No. 3 Slator, 4,225-85 feet, 412 bbls. Mid-Continent Petroleum Co. No. 1 E. F. Cowden, 4,040-4,228 feet, 1,089 bbls. Oil Well Drilling Co. No. 2-B Cowden, 4,070-4,241 feet, 719 bbls. Sinclair Prairie No. 4 Wright, 4,127-4,212 feet, 749 bbls. Stanolind Oil & Gas Co. No. 69 J. M. Cowden, 4,075-4,218 feet, 510 bbls. Texas Pacific Coal & Oil Co. No. 16 Scharbauer, 4,200-70 feet, 1,272 bbls.

Fisher County

Montour Producing Co. No. 3 Smith, 3,556-63 feet, 2,721 bbls.

Gaines County

Amon G. Carter No. 1 Geisecke, dry and abandoned at 5,800 feet.

Howard County

Iron Mountain No. 3 Snyder, 2,718-2,905 feet, 619 bbls. Stanley Cosden and others No. 1 A. E. O'Daniel, 2,685-2,848 feet, 305 bbls. Magnolia Petroleum Co. No. 4 Hyman-Chalk, 2,765-3,010 feet, 528 bbls. Ward Oil Co. No. 28 Roberts, 2,953-54 feet, 1,276 bbls.

Upton County

Basin Oil Properties No. 5-A Baker, 2,338-82 feet, 1,081 bbls. Homestead Oil & Gas No. 9 Pure-Hughes, 2,669-2,710 feet, 943 bbls. Shell Petroleum Co. No. 1 Burleson, 2,128-2,373 feet, 242 bbls.

Ward County

Gulf Petroleum Corp. No. 91 O'Brien, 2,519-2,771 feet, 494 bbls. C. E. Clark No. 1 Wathen, 2,223-35 feet, 137 bbls. P. C. & F. Oil No. 1 Nitterberg, dry and abandoned at 2,360 feet.

Winkler County

Atlantic No. 2-J Hendricks, 2,750-3,020 feet, 50 bbls. Gulf Petroleum Corp. No. 26 O. Clapp, 2,870-3,090 feet, 6,269,000 feet of gas; No. 24 Keystone, 3,437-3,500 feet, 731 bbls. Magnolia Petroleum Co. No. 1

(Continued on Page 99)

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North and East Texas

By MITCHELL TUCKER

K.M.A. Extended Northerly; Eastern Texas Property Sale

WICHITA FALLS, Tex., Feb. 28.—The K.M.A. pool of southern Wichita and northern Archer counties passed another busy week with pool developments, outpost activities and an allowable increase centering most of the attention.

The field shared largely in the small allowable increase for the North Texas district effective March 1. The daily grant for K.M.A. is now 7,431 bbls., allocated 50 per cent on acreage and 50 per cent on potential, with a limiting maximum of 500 bbls. potential and a maximum acreage allowance of 20 per well.

Ordovician Prospect

Prospect for first Ordovician oil production below the regular pay in the pool was seen in F. W. Merrick and Target Drilling Co. No. 1 Waggoner-Cranfill, about 4 miles west of production on the northwest corner of the pool. The outpost is in section 35, Block 5, H.&T.C. Survey. An electrical survey showed saturation in the Ellenburger from 3,733 feet to 3,795 feet; hard, nonporous Ellenburger lime from 3,795 feet to 3,802 feet, and porous Ellenburger containing water from 3,802 feet to 3,814 feet, total depth. The outpost will be plugged back to 3,795 feet, and casing set at 3,740 feet. Slight saturation previously had been reported in the regular K.M.A. pay from 3,635 feet to 3,655 feet.

Production on the extreme northeast corner of the pool was extended farther north by Clyde Texan Oil Fields, Inc., No. 2 Burnside, Block 128, J. M. Sharp Survey, Abstract 262. This well topped saturated lime at 3,805 feet and drilled to 3,986 feet, total depth. The well was shot with 500 quarts and flowed 200 bbls. of oil the first hour and 40 minutes while cleaning out. The test gives evidence of being considerably larger than the No. 1 Burnside to the south.

Tom B. Medders No. 1 Edith Fields, SW NE section 32, H.&G.N. Survey, Abstract 415, wildcat test about 4 miles northwest of Iowa Park and about 7 miles northeast of production in the pool, took a core just below 3,500 feet, but no showing was reported. The test is drilling ahead.

A disappointment for the northeast corner of the pool was seen in the King Oil Co. and Perkins & Cullum No. 1 Burnett, S half of SW of section 2, W. W. Carroll Survey, Abstract 434, about a mile and a half north of production. This outpost was drilling below 4,128 feet, in lime and shale, and had not found any showings.

Adding to its recently acquired territory. Shell Petroleum Corp. purchased 129 acres out of Blocks 14, 16, and 17 from the R. Lee Kempner interests in the WVFL Survey, for a consideration of $57,500 cash and some oil. The tracts lie northeast of Norwood and the Schaeffer Oil Co. No. 1 W. P. Ferguson, first producer in Archer County.

Clay County Getting Deep Pay

Seeking to extend the K.M.A. pay eastward into Clay County, much activity has been seen there in the past few weeks. Deep Oil Development Co., discoverer of the K.M.A. pool, was moving in for its No. 1 C. H. McCellan, a 4,000-foot wildcat test in the Charles Stanley Survey, Abstract 407, 6 miles northeast of Wichita Falls, but in Clay County. The Woods Royalty Co. staked No. 1 Kempner, Block 44, Bosque County School Lands Survey, southwest of Henrietta, for a 5,500-foot rotary test. Operator set 94 feet of surface casing and is drilling below 1,000 feet. Twelve miles southwest of Henrietta, Healdton Oil & Gas Co. No. 1 Wallace, Block 33, Belcher Subdivision, 4 miles west of Blue Grove, is drilling below 4,100 feet. Wirt Franklin and the Franklin Drilling Co. No. 1 A. B. Skaggs, Block 53, Angelina County School Lands, about 6 miles northeast of Henrietta, a wildcat, is drilling below 2,750 feet on a 4,500-foot contract. Barnett Petroleum Corp. No. 1 Ben Nutter, Block 30, Grayson County School Lands, is drilling below 3,800 feet on a 4,500-foot contract. This wildcat is 3 miles northeast of Blue Grove. Walter Gant, discoverer of the Worsham pool, and associates were rigging up a 6,000-foot test on Block 9, Madison County School Lands. Test is about 7½ miles east of Henrietta. Walter Gant No. 6 Worsham, in section 37, Block 4, H.&T.C. Survey, Abstract 250, is flowing 30 bbls. of oil hourly from sandy lime pay at 3,842 feet. This is the sixth producer on the Worsham ranch about 10 miles east of Henrietta.

Archer County

Hull & Silk No. 1 Wilson, deep wildcat in Archer County, Block 25, A.T.N.C.L. Survey, southwest of Holiday, is drilling below 2,600 feet. The Canyon lime was drilled from 2,380 feet to 2,420 feet, but failed to find any saturation.

Lewis Production Co. No. 1 W. C. Frey, section 18, Palo Pinto County School Lands, seeking southwest extension of production in Archer County, on the southeast edge of production, was reported to have topped lime at 3,818 feet and was coring below 3,867 feet in lime. The test was reported checking low on the lime as correlated with the pool proper.

EASTERN TEXAS FIELDS

DALLAS, Tex., Feb. 28.—Slight adjustments were made in the East and East Central Texas field allowables for March, following statewide hearing last week. With the additional four Sunday shutdowns in March as ordered, this will mean that the East Texas field will have had a total of fourteen 24-hour shutdown periods (five more than other fields in the state), which represents a restriction of approximately 7,000,000 bbls. under normal production on a seven-day week basis. Sulphur Bluff wells suffered a loss in allowable while Talco wells gained in the equalization of withdrawals from these two Paluxy sand pools of northeastern Texas. This was done by reducing Sulphur Bluff wells from 65 to 60 and raising Talco wells from 46 to 50 bbls. daily, resulting in a net gain of 1,326 bbls. daily for the whole district. Allowables by fields as of December 18, February 18 and March 1 (exclusive of Sunday shutdowns) were as follows: East Texas field 489,517, 495,939 and 497,643 bbls.; Talco 26,870, 28,489, and 31,053 bbls.; and Sulphur Bluff 3,266, 4,810 and 3,700 bbls.

Important Woodbine sand test in East Central Texas centered much attention during the past week. A new Woodbine sand wildcat has been staked in eastern Van Zandt County, 2 miles south of Grand Saline. F. A. Richarson, made location for his No. 1 B. C. Dodd, in the T. W. Hutchinson Survey. J. C. Jones of Mabank staked No. 1 Russon Mallory, in the T. Mitchell Survey, to give the Flag Lake pool of Henderson County its third test. First gas showings Lone Star No. 1 Melasky in the Buffalo area of Leon County are reported as operators cored ahead at 5,365 feet in the Woodbine, topped at 5,312 feet. First gas showing Plaza & Brooks No. 1 Davidson, wildcat north of Seagoville in southeast Dallas County, was reported last week at 1,312 feet in a break believed to be just above the Eagleford shale. Drilling continued, however, and operators are expecting to start coring for the Woodbine soon. Another failure for the Maydelle area of Cherokee County was announced in the Merca Oil Co. No. 1 Cherokee Development Co., which failed to find production in the Woodbine.

Atlantic's Big Purchase

Indicating faith in the future life of the East Texas field, Atlantic Refining Co. is in the process of adding to its production in the area through the purchase of 26 oil wells and seven tracts, Atlantic officials disclosed last week. The sale involves one of the largest cash considerations recorded in recent months for the field, a total of $725,000 under contract to be paid for the production and leases. The property is being acquired from the American Liberty Oil Co. (Toddie L. Wayne, trustee). The sale figures at better than $27,000 per well, each of which is producing its 20-bbl. daily allowable. The purchase boosts Atlantic holdings in the field to around 1,200 wells and 120 leases.

Cayuga Field

Extensive development in the south extension area of the Cayuga field, in Freestone County, is in prospect with Amerada Petroleum Corp., Magnolia Petroleum Co., and other companies planning new tests. The prospective activity was spurred by recent completion of Amerada No. 3 H. Berk, in the E. G. Rector Survey, just west of the main production of the field. Harry Bass, Dallas, purchased a 50-acre lease in the Williamson Survey from Young & Stewart for cash and oil consideration. Magnolia, owning a 58-acre lease adjoining production, is expected to start development of the tract soon.

Limestone County

North of Kosse in south Limestone County, Stanolind No. 1 Norris, Permian lime prospect, is drilling ahead past 8,840 feet in broken shale and chalk. Base of the dolomitic lime is placed at about 8,838 feet.

With top of the Travis Peak picked up at 7,480-95 feet, operators at Hunter & American Liberty Oil Co. No. 1 Carter, deep prospect on the Kelsey dome in Upshur County, are coring ahead in hard sand below 7,575 feet.

NORTH TEXAS COMPLETIONS

Clay County

W. H. Gant No. 6 C. M. Worsham, 3,935-42 feet, 1,250 bbls., flowing; an extension.

Cooke County

A. D. Robinson No. 11 J. H. Otto A, 808-86 feet, 46 bbls.

Jack County

R. D. Compton No. 16 C. C. Henderson, 319-35 feet, 75 bbls., pumping. Danciger Oil & Refining Co. No. 2 Stella M. Denman, 3,176-3,237 feet, 1,000 bbls. Hammon & Herbert No. 8 F. H. Rhodes, 2,305-14 feet, 300 bbls.

Montague County

O. V. Beck No. 21 Cora L. Devenport, 2,000-15 feet, 32 bbls., 72 hours. Continental Oil Co. No. 32 J. W. Maddox A, 870-91 feet, 33 bbls. Sinclair Prairie Oil Co. No. 22 D. T. Holt, 1,643-69 feet, 237 bbls., 24 hours. J. W. Sorrell and others No. 1 J. E. Walthall, 2,747 feet, dry.

Wichita County

EC Oil Co. No. 3 George F. Lebus and others, 3,755-3,844 feet, 1,200 bbls. Haberle & Thornton No. 1 First National Co., 3,615-3,825 feet, 1,120 bbls. Manson Oil Co. No. 2 T. F. Mitchell, 3,885-3,917 feet, 557 bbls. W. B. Omohundro No. 1 J. R. Pace B, 3,616-3,850 feet, 300 bbls. Sieboit & Harvey Drilling Co. No. 1 Munger, 3,789-3,885 feet, 1,230 bbls. Texas Co. No. 23 First National Co., 3,605-3,835 feet, 1,050 bbls. Wilson-Ligon & Burns No. 4 S. I. and H. M. Munger, 3,699-3,885 feet, 550 bbls. T. L. Wynne, trustee, No. 1 Sue Mitchell, 3,918-81 feet, 175 bbls.

Young County

F. W. Bennett No. 1 G. W. Alberts, 3,550-98 feet, 14 bbls., flowing. J. Bohner No. 1 E. R. Prideaux, 648 feet, dry. John Labusan No. 2 I. E. Self, 750 feet, dry. Lion

(Continued on Page 98)

Rocky Mountain Area

By T. R. INGRAM

Rio Blanco Discovery Tests 492 Barrels Through Tubing

DENVER, Colo., Feb. 28.—Subzero weather and a blizzard in the northern Rocky Mountain area tied up many isolated wildcats.

In Colorado, the Texas Co.-California Co. discovery well in the Morrison on Wilson Creek, Rio Blanco County, flowed 492 bbls. in 24 hours through the tubing. The Gulf Oil Corp.'s wildcat in eastern Colorado is ready to test oil and gas shows in the Pennsylvanian.

The Ohio Oil Co.-California Co. No. 6 Union Pacific-Johnson on flank of Big Medicine Bow, Carbon County, Wyoming, had water in the basal Sundance and is plugging back to first sand. One wildcat 18 miles east of Lance Creek was dry and abandoned. Lance Creek had one new operation getting under way. The Sinclair-Wyoming Oil Co. No. 77 Tensleep well in Little Lost Soldier, flowed 184 bbls. in 18 hours and is expected to do better.

Montana reported very little activity on account cold weather. Texas Co. made its first location of the year in Cut Bank.

NEW MEXICO

Indication of a new pool between the Vacuum and Maljamar areas in Lea County featured the week's activity in southeastern New Mexico. Texas Co. No. 1 Corbin, C NW SW section 10-18-33, had a showing of oil at 4,270-4,303 feet and oil rose 500 feet in the hole in 23 hours. The volume of oil had risen to 750 feet while operators drilled ahead to 4,321 feet in lime. This wildcat is 8 miles southwest of the Vacuum pool and about 6 miles southeast of the eastern edge of the Maljamar area.

Another Lea County outpost reported showing oil was Continental Oil Co. No. 1-A-31 Marsh, C NE SE section 31-20-39, about 11 miles southeast of Hobbs and near the Texas line. It was reported bailing 5 gallons of oil an hour at 4,346 feet. It was expected to be deepened.

Shell Petroleum Corp. No. 1-A State, NE section 33-18-36, is a wildcat location about 5 miles northwest of Monument and 10½ miles southeast of the Vacuum area. Nearly 5 miles northwest of that location, Continental Oil Co. No. 1-G-12 State, C SE SW section 12-18-35, has spudded.

Chief Oil & Gas Co. and Orvall J. Lee No. 1 Pace, in section 12-6n-7e, some .5 miles west of Estancia in Torrance County, was reported producing approximately 250,000 feet of carbon dioxide (dry ice) at 1,594 feet, total depth, 1 foot in pay. It is about 6 miles south of a carbon-dioxide pool in Township 7n-7e.

Lea County completions of the week follow:

W. H. Street No. 3 Woods, C NW NE section 22-22-37, had pay at 3,558 feet, total depth 3,688 feet, and flowed 136 bbls. of oil daily through choke. Packer was set at 3,639 feet and tubing perforated below packer.

Samedan Oil Co. No. 5 Hughes, C NE SW section 10-23-37, flowed and swabbed 120 bbls. of oil daily through tubing from pay at 3,568-90 feet, total depth 3,608 feet.

Rowan Drilling Co. No. 2-A Elliott, C NE SW section 27-22-37, was an abandoned location.

Repollo Oil Co. No. 1 Powhatan Carter, SW SW NE section 9-24-37, found pay at 3,519 feet, was bottomed at 3,705 feet and plugged back to 3,612 feet. It flowed 28 bbls. of oil daily through tubing, with 3,500,000 feet of gas.

Lem Peters No. 1 Graham, C SW SE section 27-22-37, flowed 65 bbls. of oil in three hours through tubing from pay at 3,540 feet, total depth 3,651 feet.

Penrose & Rowan No. 1 Carey, C NW SW section 22-22-37, an old well, was deepened from 3,555 feet to 3,628 feet, flowed 159 bbls. of oil in 18 hours through choke and was recompleted.

Ohio Oil Co. No. 4 State Hansen, C W half SW NE section 16-20-37, had pay at 3,785 feet, total depth 3,855 feet, was acidized and flowed 160 bbls. of oil in four hours.

McDowell & Weiner No. 1 Elliott, SE cor. section 19-21-37, flowed 157 bbls. of oil daily through tubing from pay at 3,764 feet, total depth 3,821 feet.

Gulf Oil Corp. No. 6-F Bell, C NW SW section 36-20-36, topped pay at 3,770 feet, total depth 3,855 feet, flowed 50 bbls. of oil in 15 hours and died. It was acidized, and flowed 1,567 bbls. of oil in 24 hours, with gas gauging 2,056,000 feet.

L. E. Elliott No. 1 Elliott, NE NE SE section 26-20-36, had pay at 3,775-80 feet, total depth, and flowed 140 bbls. of oil in four hours through choke.

Two completions in Eddy County were reported. Texas Co. No. 1 Welch Permit, C SW NE section 30-20-31, was dry and abandoned at 2,608 feet, total depth. Sulfur water rose 1,700 feet in the hole in 10 hours from 2,591-2,608 feet.

Nash & Windfohr No. 8-A Jackson, C SE SE section 13-17-30, Jackson pool, topped pay at 3,425 feet, total depth 3,518 feet, was acidized and flowed 550 bbls. of oil daily through tubing.

In Chaves County, English & Harmon No. 1 Billingslea, C S half NW SE section 9-15-29, was bottomed at 3,680 feet, plugged back to 3,456 feet, lost tools in the hole and was dry and abandoned. It had slight showings of oil at 1,625-30 feet, and 3,030-38 feet; salt water at 3,497-3,505 feet, and sulfur water at 3,532-39 feet.

Lea County

Amerada Pet. Corp. No. 6 Byrd, SE sec. 12-20-36. Loc.
Amerada Pet. Corp. No. 3 Laughlin, C NW NE sec. 9-20-37. T.D. 2,855 ft.; set 8-in. 2,573 ft.
Amerada Pet. Corp. No. 1 State VA, C SE SW sec. 23-17-34. Spd.
Amerada Pet. Corp. No. 1 State VB, C NE SW sec. 36-17-34. Drk.
Anderson-Prichard Oil Corp. No. 1 Carlson, C SW NW sec. 21-25-37. O.W.D.D.; T.D. 3,020 ft.; tstg.
Anderson Prichard Oil Corp. No. 1 Harrison, SW cor. sec. 23-25-37. Drlg. 3,250 ft.
Anderson-Prichard Oil Corp. No. 2 Jal, C NW NE sec. 8-25-37. T.D. 2,540 ft.; P.B. 1,240 ft.; W.O.C.
Anderson-Prichard Oil Corp. No. 1 Wells, C SE SE sec. 5-27-37. Drlg. 3,610 ft.
Anderson-Prichard Oil Corp. No. 2 Langlie, SE sec. 8-25-37. Drlg. 3,325 ft.
Bradley Oil Co. No. 1 Downes, SE NE SE sec. 5-22-37. Drlg. 285 ft.
Cities Service Oil Co. No. 1-H State, C NE NE sec. 17-22-36. T.D. 3,884 ft.; prep. to deepen.
Continental Oil Co. No. 1-A-22 Elliott, C SW SW sec. 22-22-37. O.W.D.D.; T.D. 3,592 ft.; shot; flows 60 B.O.P.D.; C.O.
Continental Oil Co. No. 3-B-6 Elliott, C SE SE sec. 6-22-37. T.D. 3,778 ft.; flows 25 B.O.P.D.
Continental Oil Co. No. 1-B-9 Elliott, NW sec. 9-22-37. T.D. 3,725 ft.; flows 40 B.O.P.D.; tstg.
Continental Oil Co. No. 1-A-20 Jack, C NE SE sec. 20-24-37. Drlg. 3,555 ft.
Continental Oil Co. No. 3-B-31 Lockhart, SE sec. 31-21-36. T.D. 3,924 ft.; flwd. 64 B.O.P.D.
Continental Oil Co. No. 1-A-31 Marsh, SE sec. 31-20-39. Wildcat; T.D. 4,346 ft.; C.O.
Continental Oil Co. No. 2-B-23 Reed, NE SE NE sec. 23-20-36. Drlg. 3,510 ft.
Continental Oil Co. No. 4-B-24 Reed, CEL NW SW sec. 24-20-36. R.U.R.
Continental Oil Co. No. 8-A-14 Sanderson, NE NW SE sec. 14-20-36. R.U.R.
Continental Oil Co. No. 1-B-14 Sanderson, NE SW SE sec. 14-20-36. Drlg. 2,964 ft.
Continental Oil Co. No. 3-E-17 State, C NW NW sec. 17-22-36. Drlg. 3,730 ft.
Continental Oil Co. No. 1-F-1 State, C SW SW sec. 1-21-36. Drlg. 3,720 ft.
Continental Oil Co. No. 1-G-12 State, C SE SW sec. 12-18-35. M.I.M.
Cranfill & Germany No. 1 Weir, C NE NE sec. 15-20-37. T.D. 4,210 ft.; S.D.O.
Culbertson & Irwin No. 2 Alston, NE SW NW sec. 26-25-37. Drlg. 2,760 ft.
Culbertson & Irwin No. 5-A Humphrey, NE NW SE sec. 3-25-37. Drlg. 3,320 ft.
Culbertson & Irwin No. 7-A Humphrey, NE SW SE sec. 3-25-37. Loc.
Culbertson & Irwin No. 1 Liberty Royalty, NW sec. 3-25-37. Drlg. 3,090 ft.
J. P. Cusack, Inc., No. 1 Turner, SW NE SE sec. 34-18-38. Drlg. 1,304 ft.
Danglade & Clower No. 1 Currie, NE NE SW sec. 6-21-37. Drlg. 192 ft.
Danglade & Clower No. 1 Glier, C SW NE sec. 33-22-37. Drlg. 3,383 ft.
A. R. Eppenauer No. 1 Stuart, NW NE NE sec. 22-25-37. Drlg. 1,235 ft.
J. E. Farrell No. 2-C Walden, C SE SW sec. 15-22-37. Drlg. 3,700 ft.
Geo. F. Getty No. 1 Riggs, NW sec. 1-26-36. Wildcat; drlg. 3,150 ft.
Geo. F. Getty No. 1-F State, C NE NE sec. 36-17-34. Drlg. 4,550 ft.
Gulf Oil Corp. No. 1 Boyd, sec. 23-22-37. T.D. 3,681 ft.; tstg.
Gulf Oil Corp. No. 3 Day, SE SE SW sec. 6-22-36. Drlg. 3,835 ft.
Gulf Oil Corp. No. 1 Elliott, SW SE SE sec. 15-25-37. Drlg. 3,420 ft.
Gulf Oil Corp. No. 2-D Kutter, C SE SW sec. 8-19-37. Drlg. 3,650 ft.
Gulf Oil Corp. No. 1-D Mattern, SW sec. 6-22-37. T.D. 3,795 ft.; P.B. 3,787 ft.; R.U.S.T.
Gulf Oil Corp. No. 3 McCormack, C SE SE sec. 32-21-37. Drlg. 2,600 ft.
Gulf Oil Corp. No. 1 LeMunyon, C NE NE sec. 28-23-37. Oild well; T.D. 3,666 ft.; pmpd. 3 B.O.P.D.
Gulf Oil Corp. No. 2 Ramsey, C SW SW sec. 27-21-36. Drlg. 3,760 ft.
Gulf Oil Corp. No. 1 J. Whitten, SE SE SW sec. 33-23-36. Drk.
Gulf Oil Corp. No. 1 Woolworth, C NE SE sec. 30-24-37. T.D. 3,803 ft.; P.B. 3,780 ft.
Humble O. & R. Co. No. 2 Greenwood, C NE SW sec. 9-22-37. Loc.
Humble O. & R. Co. No. 3 Williams, C SW NW sec. 34-24-37. T.D. 3,532 ft.
Jal Nat. Gas Corp. No. 2 Justis, NE sec. 20-25-37. T.D. 3,029 ft.; tstg.
Kan-Mex Corp. No. 2-B-3 Vaughn, NW cor. sec. 3-24-36. Drlg. 1,076 ft.
Carl B. King No. 1-A Stuart, NW NE NW sec. 14-25-37. Drlg. 3,065 ft.
Harry Leonard No. 1 Ginsberg, NW sec. 29-25-38. Wildcat; drlg. 2,930 ft.
Magnolia Pet. Co. No. 1 State G, NW NW NE sec. 34-17-34. T.D. 4,905 ft.; P.B. 4,794 ft.
Magnolia Pet. Co. No. 1-H State, C NW NW sec. 31-17-35. Drlg. 4,551 ft.
Magnolia Pet. Co. No. 1-I State, C NW SW sec. 36-17-34. Drlg. 4,365 ft.
Magnolia Pet. Co. No. 1-J State, C NE SE sec. 22-17-34. Drlg. 800 ft.
Magnolia Pet. Co. No. 1-K State, C NW SE sec. 31-17-35. R.U.R.
Magnolia Pet. Co. No. 2 State-Bridges, sec. 14-17-34. T.D. 4,593 ft.; flwd. 51 B.O. in 1 hr., naturally.
J. A. Mascho No. 1 Cloyd, C SE SE sec. 20-22-23. Wildcat; T.D. 3,516 ft.; P.B. 3,190 ft.; drld. to 3,207 ft.
C. T. McLaughlin No. 1 Polhamus, NE sec. 9-24-37. T.D. 3,672 ft.; drlg. plug.
C. T. McLaughlin No. 1 Imperial Royalties, NW SE NW sec. 9-24-37. T.D. 3,436 ft.; waiting on spudder.
National Drlg. & Prod. Co. No. 1 Flint, C NE NE sec. 29-20-34. Wildcat; drlg. 3,695 ft.
Ohio Oil Co. No. 1 Hardy, NE NE SE sec. 20-21-37. T.D. 3,639 ft.; fsg.
Ohio Oil Co. No. 1 Kutter D, C SW SW sec. 18-19-37. Drlg. 3,590 ft.
Ohio Oil Co. No. 7 State-McDonald, C SW SE sec. 16-22-36. T.D. 3,871 ft.; C.O.
Ohio Oil Co. No. 1 State-Warn, C SE NW sec. 21-17-35. Drlg. 4,452 ft.
Parker Drlg. Co. No. 1 Irwin, C W½ SW SW sec. 35-24-37. Drlg. 3,225 ft.
Phillips Pet. Co. and Pure Oil Co. No. 1 Woolworth, C SE NE sec. 33-24-37. Drlg. 1,255 ft.
Phillips Pet. Co. No. 2 New, CEL SE NE sec. 26-20-36. Cellar, pits.
Phillips Pet. Co. No. 2 Santa Fe, C SW SE sec. 30-17-35. Drlg. 1,563 ft.
Phillips Pet. Co. No. 1 Santa Fe, C SW NW sec. 31-17-35. Drlg. 2,450 ft.
Plains Prod. Co. No. 1 Humphreys, NE sec. 3-25-37. Loc.
Repollo Oil Co. No. 3 Christmas, NW NW NE sec. 28-22-37. T.D. 3,726 ft.; P.B. 3,664 ft.; C.O.
Repollo Oil Co. No. 4 Moseley, SW SE NE sec. 34-24-37. Drlg. 60 ft.
Repollo Oil Co. No. 4 Roach, NW NW SW sec. 21-20-37. T.D. 3,875 ft.; P.B. 2,860 ft.; shot; R.U.S.T.; S.D.O.
Repollo Oil Co. No. 3-C Stuart, SE NE SW sec. 10-25-37. O.W.D.D.; drlg. 3,660 ft.
Repollo Oil Co. No. 4-D Stuart, SW sec. 10-25-37. Drlg. 3,152 ft.
Shasta Oil Co. No. 2 Woolworth, NE NW NW sec. 28-24-37. Drlg. 660 ft.
Shell Oil Corp. No. 2 Grizzell, C NE SE sec. 8-22-37. Drlg. 3,563 ft.
Shell Pet. Corp. No. 1-A State, C NW SE sec. 16-23-36. Drlg. 3,620 ft.
Shell Pet. Corp. No. 1-A State, NE cor. sec. 38-18-36. Loc.
Shell Pet. Corp. No. 4-E State, C SW NW sec. 12-20-36. Drlg. 3,800 ft.
Shell Pet. Corp. No. 1 J. L. Whitten, NE SW SE sec. 33-23-36. R.U.R.
Sindorf et al No. 1 Glier, NE cor. sec. 33-22-37. Drlg. 2,165 ft.
Skelly Oil Co. No. 5 J. B. Baker, C SE NW sec. 27-22-37. T. D. 3,620 ft.; tstg.
Skelly Oil Co. No. 2 Hill, C NW NE sec. 6-21-37. Drlg. 3,045 ft.
Skelly Oil Co. No. 3 G. W. Sims, C NW NE sec. 9-23-37. T.D. 3,642 ft.; C.O.
Skelly Oil Co. No. 1-C R.R. Sims, sec. 3-23-37. Drlg. 3,688 ft.
Skelly Oil Co. No. 1-E W. P. Sims, C NW NE sec. 10-23-37. T.D. 3,625 ft.; flwd. 452 bbls. in 24 hrs.
Skelly Oil Co. No. 1-K State, NE NE NW sec. 32-21-37. Drlg. 1,438 ft.
Skelly Oil Co. No. 1 Toby, C SW SW sec. 7-24-37. Drlg. 2,384 ft.
Stanolind O. & G. Co. No. 2-A Hill, C NE SE sec. 6-21-37. Loc.
Stanolind O. & G. Co. No. 2-C Hill, C SW NW sec. 5-21-37. Drlg. 2,645 ft.
Stanolind O. & G. Co. No. 3-C Hill, C NW NW sec. 5-21-37. Loc.

Stanolind O. & G. Co. No. 4-B Myers, C SW NW sec. 21-24-37. Drlg. 3,190 ft.
Sun Oil Co. No. 4 Stuart, C SE NE sec. 15-25-37. Drlg. 732 ft.
Texas Co. No. 1 Corbin, C NW SW sec. 19-18-33. Drlg. 4,270 ft.
Texas Co. No. 3 Falby, C NE SW sec. 8-22-37. Drlg.
Texas Co. No. 3 Fristoe, NW SE NE sec. 3-25-37. Drlg. 2,330 ft.
Texas Co. No. 14 Lieu Lands, SW SW NW sec. 19-20-37. Drlg. 3,664 ft.
Texas Co. No. 1-B Moberly, C NE NE sec. 21-26-37. Drlg. 3,130 ft.
Texas Pacific C. & O. Co. No. 8-A State, Acct. 2, C SE SE sec. 7-22-36. Drlg. 3,468 ft.
Texas Pacific C. & O. Co. No. 9-A State, Acct. 2, NW SW NE sec. 7-22-36. Drlg. 3,125 ft.
Tide Water Associated Oil Co. No. 2 Day, C E½ NW NW sec. 6-22-36. Drlg. 3,454 ft.
Two States Oil Co. No. 2 Downes, C NE NE sec. 6-22-37. Drlg. 3,718 ft.
Western Gas Co. No. 1 Davis, C SW SE sec. 33-23-37. Drlg. 2,092 ft.

Eddy County

F. E. Baker No. 1 Eddy, NE sec. 12-22-27. Drlg. 2,117 ft.
Barnett Oil Dev. Co. No. 1 King Permit, C NW SE sec. 23-26-30. Drlg. 980 ft.
Carper Drlg. Co. No. 3 Gissler, C E½ E½ NW sec. 23-17-30. Drlg. 557 ft.
Danciger O. & R. Co. No. 4-A Turner, C SW SW sec. 18-17-31. Loc.
Danciger O. & R. Co. No. 1-B Turner, CEL NE SE sec. 17-17-31. Loc.
D. & B. Oil Co. No. 2 Jenkins, SW NW NW sec. 20-17-30. T.D. 3,265 ft.; flwd. 20 B.O.P.D.
D. & B. Oil Co. No. 3 Jenkins, NE NE NW sec. 20-17-30. Loc.
Emperor Oil Co. No. 4 Puckett, C NE NE sec. 24-17-31. Drlg. 2,212 ft.
Emperor Oil Co. No. 5 Puckett, C SW NE sec. 24-17-31. Drlg. 865 ft.
Finley & Cherry No. 1 Buchley, C NW NW sec. 28-16-31. Wildcat; T.D. 3,750 ft.; S.D.
Flint Prod. Co. No. 1-B State, SE sec. 20-17-30. Drlg. 3,830 ft.
C. J. Frederick No. 1 Reed, C NE SW sec. 28-24-28. Drlg. 1,450 ft.
F. W. & Y. Oil Co. No. 8-A Gissler, NE NW NE sec. 23-17-30. Drlg. 2,400 ft.
F. W. & Y. Oil Co. No. 9-A Gissler, C SE NE sec. 14-17-30. Drlg. 1,240 ft.
F. W. & Y. Oil Co. No. 1-B Gissler, SW sec. 15-17-30. Drlg. 2,855 ft.
F. W. & Y. Oil Co. No. 2-B Gissler, C NW NW sec. 24-17-30. T.D. 3,505 ft.; S.&F. 150 B.O.P.D.; C.O.
F. W. & Y. Oil Co. No. 3 Jackson, C NW SE sec. 13-17-30. T.D. 2,953 ft.; fsg.
Grayburg Oil Co. No. 11 Burch, NE NE SE sec. 19-17-30. Drlg. 1,300 ft.
Grayburg Oil Co. No. 4 Keely, SE SW NE sec. 24-17-9. Drlg. 3,130 ft.
M. A. Grisham No. 1 Chaytor, NE sec. 10-24-26. T.D. 1,967 ft.; est. 10 B.O.P.D.; tstg.
H. A. Hartwell No. 1 Vandagrift, NE NE SE sec. 8-18-27. Drlg. 1,326 ft.
R. L. Holcomb No. 1 State, NW sec. 22-17-28. Drlg. 1,265 ft.
Woodworth Hawkins No. 1 Mack, C SW SW sec. 20-24-27. T.D. 2,402 ft.; 100 ft. W.I.H.; S.D.O.
C. F. Ingram No. 1 Page, NE NE SW sec. 15-21-28. T.D. 1,495 ft.; S.D. for new rig.
B. M. Koehane et al No. 1 Shannon, SE cor. sec. 27-16-31. Drlg. 1,310 ft.
Paul Moran No. 1 Crawford & Smith, NW NW SW sec. 24-24-26. Drlg. 473 ft.
Murchison & Closuit No. 2-A State, NW SE SW sec. 16-17-31. Drlg. 2,305 ft.
Nash-Windfohr & Brown No. 2-B Stevens, NW sec. 13-17-30. Drlg. 3,488 ft.
Pecos Valley Gas Co. No. 1 Sappenfield, C SE SE sec. 4-16-28. Drlg. 75 ft.
Red Gulch Oil Co. No. 2 Keyes, C SW SE sec. 4-17-28. R.U.S.T.
Repollo Oil Co. No. 3-D McIntyre, SE cor. sec. 17-17-30. T.D. 3,241 ft.; tstg.
Repollo Oil Co. No. 4-D McIntyre, NW NE NE sec. 21-17-30. Drlg. 1,930 ft.
Repollo Oil Co. No. 2-A Parke, NW NW NE sec. 22-17-30. Drlg. 410 ft.
Repollo Oil Co. No. 1-B Parke, SW cor. sec. 15-17-30. Drlg. 1,520 ft.
Paul Sargent No. 1 State, NE sec. 16-17-31. T.D. 3,749 ft.; B.P. 3,745 ft.; tstg.
R. A. Shugart No. 1 Coulthard, C NW SW sec. 35-18-31. T.D. 4,088 ft.; to P.B.
W. K. Royalty No. 2 State, C NW NE sec. 16-17-31. Drlg. 1,015 ft.
W. O. Snyder No. 1 Pecos Irrigation, C NE SE sec. 15-25-28S. T.D. 3,138 ft.; drlg. up packer rubber.
Western Drlg. Co. No. 1-A Western, SE SW NW sec. 23-17-29. Cellar and pits.
Neil Wills et al No. 1-A State, C S½ SW SE sec. 17-20-30. Drlg. 1,447 ft.
Martin Yates, Jr., No. 1 Conlon, SW NW NW sec. 7-24-27. T.D. 1,732 ft.; S.D.O.

Chaves County

E. J. Fisher No. 1 Etz Permit, NE sec. 23-7s-26. Drlg. 1,307 ft.
Grastorf & Caudill No. 1 Smith, C NE NE sec. 1-4s-29. Wildcat; T.D. 70 ft.; S.D. for water.
J. & L. Drlg. Co. No. 2 Hurd, SW sec. 11-11-26. Drlg. 296 ft.

Curry County

Bond & Harrison No. 1 Hart Ranch, C NW SE sec. 13-2n-31. T.D. 3,258 ft.; S.D.O.

De Baca County

Land Owners Oil Co. No. 1 McAdoo, SW cor. sec. 16-1s-7e. O.W. prep to deepen from 5,850 ft.
James D. Ward No. 1 Summers, NW NE SW sec. 17-4n-20. T.D. 260 ft.; S.D.
N. F. Woods No. 1 Jones, C NE SW sec. 17-4n-20. T.D. 25 ft.; S.D.

Dona Ana County

Jules C. Bertrand No. 1 Casad Permit, sec. 24-26-5e. T.D. 47 ft.; S.D.O.

McKinley County

S. Dysart No. 1 Govt., NE sec. 14-14-10w. T.D. 1,390 ft.; fsg.

Otero County

Fred Turner, Jr., No. 1 Ella Everett, C SE SE sec. 34-22-13. Drlg. 1,550 ft.
Fred Turner, Jr., No. 1 H. V. Everett, SE SE sec. 28-22-13. Drlg. 1,700 ft.

Roosevelt County

C. S. Peterson and Conquistadores Oil Co. No. 1 Good, NW SE SE sec. 28-5s-30. T.D. 455 ft.; S.D.O.

NORTHWEST NEW MEXICO

San Juan County

Continental Oil Co. No. 71 Rattlesnake, 1,320 ft. W NE cor. line, sec. 2-29n-19w. R.U. (first report).

Socorro County

Central New Mex. Oil Co. No. 1 Belen Land Grant, NW sec. 16-3n-1e. Drlg. 2,665 ft. sdy. sh.

Torrance County

Chief Oil & Gas Co. No. 1 Pace, SE sec. 12-6n-7e. T.D. 1,594 ft.; rng. 8-in. liner to S.O. show for 250,000 ft. carbon dioxide gas.

COLORADO

Archuleta County

Carl D. Lindstrum, president of the Cortez Oil Co., advises that that company's No. 1-A Crowley, NW SE NE 2-32n-2e, which was reported last week as having reached contract depth at 2,000 feet, will be carried through the Dakota series when drilling is resumed in the spring. Upper Dakota was dry. Location is in the Price district.

Pagosa Oil & Dev. Co. No. 1 Macht, C sec. 32-36n-1w. Resumed at 328 ft. where it S.D. last December after landing 12½-in. on bttm.

Cheyenne County

The Gulf Oil Corp. No. 1 Union Pacific-Larson, C SE NW section 13-13s-49w, was expected to start testing late in the week. All available accommodations in hotels in towns within a radius of 50 miles of the well have been reserved for several days for scouts and officers of oil companies from as far away as the Mid-Continent and Texas fields. Farmers and business men from the surrounding country are on the ground in trailers and such accommodations as they could bring along. Most of the cars have heaters and some of these are being used to sleep in.

There is no change in depths. The first show of oil and gas was through the drilling mud at 4,808-10 feet. The hole then was cored 3 feet to 4,813 feet. Hole was reamed to the top of the show in the Shawnee member of the Pennsylvanian where the 9⅝-inch was cemented the first of the week. The cement plug was drilled out with rotary bit and tubing was run and everything was in readiness to unload the well of the heavy drilling mud. Cable tools have been strung up and if no water shows up after the hole is washed, it will be deepened slowly. If the formation should show water, drilling with rotary bit will be resumed.

LaPlata County

N. Spatter No. 1 Bryce, SE SW SW sec. 31-33n-9w. T.D. 1,510 ft.; shot hole to loosen tools; prep. to sidetrack.

Lincoln County

Consolidated Smelting & Metals Co. No. 1 Hancock, NE NE SW sec. 7-17s-52w. T.D. 2,888 ft. in red sdy. sh.; C.O. caves and W.O. csg.

Montezuma County

McElmo Oil Co. No. 1 West, NE NW NE sec. 31-36n-17w. Pulled csg.; rec. bit; rerun 4¾-in. to 3,840 ft.; drlg. 3,850 ft.

Park County

South Park Oil Co. No. 1 Lemar, NE NE NE sec. 34-11s-75w. S.D. 5,735 ft.

Rio Blanco County

The Texas Co.-California Co. No. 1 Unit, SW SE NW section 35-3n-94w, discovery well on the Wilson Creek structure, was given a final test this week and was shut in until spring. It flowed 492 bbls. in 24 hours through the tubing at the plugged depth of 6,700 feet. The 7-inch was set at 6,817 feet with 140 sacks and casing was perforated opposite the Morrison sand at 6,665-85 feet. The oil is green in color with a paraffin base and tests 46 gravity. Before completing the hole was drilled to 6,918 feet and tested the Sundance. The cores showed saturation in that horizon, but when unloaded it produced only water. It was then plugged back and completed in the Morrison.

The two companies will recheck the geology of the structure and are expected to drill a Sundance test

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this year. The structure is completely unitized, including all operating and royalty rights. The two companies control all of the acreage on the structure, all of which is government land. There are 16,000 acres inside the closing contour and maps show a closure of 900 feet. The discovery is down structure as shown by geology on which two tests formerly had been drilled, neither of which reached the Morrison. Rotary table elevation of the discovery well is 8,051 feet. The discovery is expected to result in the testing of several other structures in western Colorado this year.

WYOMING

Carbon County

The Ohio Oil Co.-California Co. No. 6 Union Pacific-Johnson, an outside well on the northwest flank of Big Medicine Bow, drilled into the basal Sundance at a total depth of 5,577 feet and made 67 bbls. of water per hour on a drill stem test. Top of the lower Sundance was at 5,439 feet. Hole was plugged back to 5,365 feet with 100 sacks and will test the upper Sundance at 5,330-50 feet.

Italo Pet. Co. No. 1 Tunney-Bragg, NE SE NW sec. 11-26n-81w. Drlg. 1,205 ft.
Sinclair-Wyoming Oil Co. No. 12-B Wertz, SE NW NW sec. 7-26-89w. Drlg. 4,269 ft. in r.b.; no shows in Sundance.
Ohio Oil Co.-California Co. No. 4-A Kyle, 661 ft. from N line and 648 ft. from E line, sec. 26-21n-79w. Drlg. 5,202 ft.
Ohio Oil Co.-California Co. No. 6 Union Pacific-Johnson. C SW SE sec. 23-21n-79w. T.D. 5,577 ft.; P.B. to 5,365 ft.; W.O.C.
Ohio Oil Co. No. 14 H.&C., SE NW SW sec. 35-20n-78w. Drlg. 1,482 ft.

Fremont County

Sinclair-Wyoming Oil Co. No. 2-B Muskrat, NW NW NE sec. 4-33n-92w. T.D. 4,074 ft.; cmtd. 9⅝-in. at 1,047 ft. with 450 sacks.
Stanolind O. & G. Co. No. 1 Govt., C SE SE sec. 3-33n-96w. Drlg. 7,617 ft.
Consolidated Oil Properties No. 3 Ewart, C SW SE sec. 16-1n-14w. T.D. 700 ft.; rng. form. test.

Hot Springs County

Delaware Oil Co. No. 1 Govt.-Skelton, C SE SE sec. 2-43n-96w. Cased off flow noninflam. gas at 270 ft. in Tensleep; drlg. 375 ft.

Natrona County

The General Petroleum Corp. No. 1 Government, a deep test on the Cole Creek dome, northwest of the Big Muddy field and east of the Midway dome, has reached a critical depth. Last official report was to the effect that it was coring below 6,543 feet, feeling for the top of the Wall Creek. Unofficial information indicates it would reach the top of the objective at around 6,690 feet, or somewhat higher than expected, and that probably it was now in that horizon. The test is located on a block of 12,000 acres and was spotted after an intensive geological and geophysical survey of the area. It had good shows in the Shannon sand which was cased off with the 11¾-inch at 4,624 feet without testing.

General Pet. Corp. No. 1 Govt., C NW SE sec. 21-35n-77w. Cg. for the Wall Creek below 6,543 ft.
Stanolind O. & &G. Co. No. 8 T.P.-Wyo.-Asso.-35, C NW NW sec. 35-40n-79w. T.D. 3,997 ft.; tstg.

Niobrara County

Lewis Gokel No. 1, NE SE NW section 31-35n-62w, a wildcat in the Hat Creek district 18 miles east of the Lance Creek field, was dry and abandoned at 1,450 feet. It had the Muddy sand at 453-473 feet and tops as follows: Dakota, 583 feet; Lakota, 735 feet; Morrison, 747 feet; Sundance, 1,068 feet; red beds, 1,445 feet.

Continental Oil Co. No. 5 Joss, SW NE sec. 6-35n-65w. Loc. (first report).
Argo Oil Co. No. 5 Ford, C SW SE sec. 33-36n-65w. Bldg. rig.
H. D. Moore et al No. 1 Beregren, NW sec. 23-35n-63w. Drlg. 636 ft. in variegated sh. (formerly W. A. Maupin et al.)
Continental Oil Co. No. 3-A Diehlman, SE SE SW sec. 5-35n-65w. Drlg. 3,239 ft. in L. and sh.
Continental Oil Co. No. 3 Apex-1, SE SE NE sec. 34-36n-65w. Drlg. 4,867 ft.; top Opeche 4,705 ft.
Argo Oil Co. No. 6 Ford, NW SW NW sec. 33-36n-65w. Drlg. 4,445 ft.; top r.b. 4,074 ft.
C. L. Price No. 1 Lamb, NE NW NW sec. 7-35n-65w. T.D. 4,993 ft.; circulating to free D.P.; top Minnekahta 4,772 ft.
Ohio Oil Co. No. 8 Converse Sheep, NW SE SW sec. 32-36n-65w. T.D. 4,994 ft.; cmtd. 7-in. on top Leo at 4,924 ft.; W.O.C.

Park County

Ohio Oil Co. No. 4 Mack-O.P.C.-4, SE SW SE sec. 30-58n-99w. T.D. 3,092 ft.; P.B. to 2,850 ft.; cmtd. 8⅝-in. at 2,790 ft.; drlg. plug to test.
Resolute Oil Co. No. 4 N. P., C NE NW sec. 21-57n-101. Shot 40 qts. at 8,625-54 ft. in Frontier; C.O.; S.G., no oil.
Resolute Oil Co. No. 3 N. P., C NE NE sec. 20-57n-101w. Pumped 7 to 8 B.P.D. at 8,670 ft.; not officially comp.

Sweetwater County

The Sinclair-Wyoming Oil Co. completed No. 77, SE NE NE section 10-26n-90w, in the Little Lost Soldier field for 184 bbls. in 18 hours, flowing through the 2½-inch tubing, from the Tensleep at 4,049 feet, total depth. The 7-inch is at 3,979 feet and top of saturation was at 3,991 feet. The well probably will improve upon being put on production. It was shut in when available storage was filled and it did not fully clean itself. It is a diagonal offset on the northwest to the same company's No. 75-A, the discovery well in the Tensleep, which was completed in 1930 for 2,500 bbls. initial at 3,942-4,005 feet. The oil is 35 gravity. Little Lost Soldier has produced around 54,000 bbls. to the acre from sands above the Sundance, but in recent years wells drilled to the shallow horizons have been small producers.

MONTANA

Big Horn County

P. O. Oil & Gas Co. No. 1, NW NE NE sec. 25-9s-35e. Drlg. 340 ft.
E. L. Dana No. 1 Hardy, SW NW sec. 22-9s-35e. S.D. 700 ft.

Carbon County

R. C. Tarrant No. 2 Heare, NW SE NW sec. 14-6s-10e. T.D. 1,705 ft.; cmtd. cave at 1,300 ft.
Sha-Wa Pet. Co. No. 1 Govt., SW SW NE sec. 35-9s-23e. Drlg. 3,120 ft.; 8⅝-in. at 3,027 ft.

Glacier County

Jack Marshall No. 2 All.-119, SE SE NW section 1-32n-6w, a Cut Bank completion last week, pumped 50 bbls. first 24 hours at 3,045 feet.

One new operation was reported.

Texas Co. No. 1 Lindquist, C SE SE sec. 17-32n-5w. M.I.M. (first report).
Glacier Prod. Co. No. 1 McNamer, CEL SE NE sec. 15-36n-5w. Spdg.
Santa Rita O. & G. Co. No. 8 Tribal, C NE SW sec. 16-35n-6w. R.U.
A. B. Cobb No. 1 State, C NE NE sec. 30-37n-4w. T.D. 2,592 ft.; S.D. until spring.

Lewis and Clark County

Lewis & Clark Oil Synd. No. 1 Heilman, NW NW SW sec. 11-18n-5w. S.D. 1,725 ft. in Kootenai, acct. blizzard; ran 8¼-in. 300 ft into Kootenai at approx. 1,425 ft.

Toole County

Superior Pet. Co. No. 7-A, NE NW NW sec. 12-35n-3w. Skdg. rig from No. 7.

Yellowstone County

Broadview Dome Oil Co. No. 1 Stallinberger, NE NE SW sec. 18-3n-23e. Drlg. 4,504 ft.
Riverton Oil Co. No. 1 Fox, CEL NW NE sec. 14-2n-23e. T.D. 1,795 ft.; cmtd. 8¼-in. on bttm.; W.O.C.

UTAH

Grand County

Utah Southern Oil Co. No. 1 Hyde, SE NW NW sec. 33-22s-22e. T.D. 6,715 ft.
Columbia Crude Corp. No. 1 Rath, NW SW SE sec. 12-25s-20e. S.D. 3,000 ft. acct. weather.
Cane Creek Oil Co. No. 1 Govt., NW SW sec. 31-26n-21e. Drlg. 898 ft.

Summit County

Longwell Pet. Co. No. 1, SE SW SE sec. 35-3n-5e. Drlg. 2,650 ft.

East Texas Fields

(Continued from Page 95)

Oil & Refining Co. No. 1 King and others, 3,710-68 feet, 1,400 bbls. Sams & Watson No. 3 F. M. Cullers, 538-83 feet, 10 bbls. R. W. Scott No. 1 C. J. Hankins, 1,100 feet, dry. Stuckey Oil & Gas Co. No. 2 S. R. Jeffery, 898 feet, dry. Henry Zweifel No. 1 P. E. Mueller, 3,733-3,825 feet, 15 bbls.

Wilbarger County

Falls Refining Co. No. 1 J. L. Owens, 2,247 feet, dry.

EAST TEXAS FIELD COMPLETIONS

(One hour gauges)

Cherokee County

The Texas-Gulf Petroleum Co. No. 1 Stone, dry and abandoned at 3,740 feet.

Gregg County—Longview Area

R. H. Dearing & Son No. 6 Elmua Chappel, 3,602-25 feet, 35 bbls. Humble Oil & Refining Co. No. 46 W. R. Hughes, 3,605-25 feet, 36 bbls. Iowa-Payne Oil Co. No. 6 J. W. Aiken, 3,532-3,602 feet, 80 bbls. Magnolia Petroleum Co. No. 11 J. H. Beavers, 3,545-59 feet, 120 bbls.; No. 18 Todd-Stinchcomb, 3,555-75 feet, 100 bbls. Margay Oil Co. No. 9 T. Christian, 3,655-75 feet, 64 bbls. Sinclair Prairie Oil Co. No. 22 M. Lawson, 3,508-3,608 feet, 75 bbls. Stanolind Oil & Gas Co. No. 30-B Lathrop, 3,591-3,623 feet, 54 bbls. Sun Oil Co.

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No. 40 J. M. Haynes, 3,608-76 feet, 60 bbls.; No. 29 J. W. Aikens, 3,513-3,613 feet, 60 bbls. Tide Water No. 30 Castleberry, 3,568-80 feet, 42 bbls. W. F. Farmer No. 14 A. Jones, 3,598-3,637 feet, 70 bbls.

Gregg County—Kilgore Area

J. H. Bullard No. 2 J. C. Still, 3,534-50 feet, 20 bbls. in eight hours on pump; No. 3 J. C. Still, 3,546-50 feet, 20 bbls. in six hours on pump. General American No. 13 D. Smith, 3,584-85 feet, 80 bbls.; No. 13 S. Scott, 3,646-59 feet, 49 bbls. R. E. Kennedy No. 1 Adams & Hale, 3,552-79 feet, 40 bbls. Gulf Petroleum Corp. No. 11 A. Nichols, 3,678-91 feet, 60 bbls. Humble Oil & Refining Co. No. 91-B S. S. Laird, 3,558-3,635 feet, 60 bbls.; No. 92-B S. S. Laird, 3,557-3,627 feet, 60 bbls. McCullough, Rec. No. 7 L. Martin, 3,705-08 feet, 60 bbls.

Magnolia Petroleum Co. No. 12 N. Radford, 3,588-3,600 feet, 88 bbls. P. L. Miller No. 4 B. Laird, 3,533-80 feet, 96 bbls. J. W. Pearce No. 2-B T. Shaw, 3,535-45 feet, 40 bbls. Rancho Oil Co. No. 5 Crim, 3,534-74 feet, 50 bbls. Sun Oil Co. No. 30 A. G. Morton, 3,491-97 feet, 50 bbls. Tide Water No. 19 J. Blanchman, 3,646-51 feet, 150 bbls.; No. 35 M. B. Hughey, 3,486-90 feet, 150 bbls.

Rusk County—Kilgore Area

Greier Bros. No. 7 Williamson, 3,680-81 feet, 10 bbls. Gulf Petroleum Corp. No. 11 Brightwell, 3,588-3,600 feet, 35 bbls. Magnolia Petroleum Co. No. 17 Bradberry, 3,663-65 feet, 40 bbls. Overton Refining Co. No. 4-B G. H. Morris, 3,628-29 feet, 10 bbls.

Rusk County—Joiner Area

Ambassador Oil Co. No. 10 London School, 3,743-65 feet, 60 bbls. Atlantic No. 7-F C. Young, 3,653-67 feet, 78 bbls. Bond Oil Co. No. 3 J. L. Maxwell, 3,730-49 feet, 60 bbls. Chaplain-Bass No. 5 J. R. Alford, 3,768-81 feet, 56 bbls. Duo Oil Co. No. 5-A A. Thrash, 3,672-92 feet, 74 bbls. East Shore Oil No. 11 B. Fox, 3,666-80 feet, 60 bbls. Granite No. 2-S C. Young, 3,651-3,721 feet, 75 bbls. Humble Oil & Refining Co. No. 11 J. D. Florey, 3,682-92 feet, 70 bbls.

Humble Oil & Refining Co. No. 23 Mullikin, 3,695-3,705 feet, 65 bbls.; No. 7 E. S. Thrash, 3,778-85 feet, 60 bbls. Marco Oil Co. No. 9 T. Lacey, 3,653-54 feet, 20 bbls. Powers & Kline No. 7 M. Lee, 3,650-51 feet, 20 bbls. Normandie Oil No. 3 Keeling, 3,736-60 feet, 115 bbls. Ohio Oil Co. No. 86 M. M. Cross, 3,621-48 feet, 36 bbls. Stanolind Oil & Gas Co. No. 12 M. O'Quinn, 3,787-89 feet, 43 bbls. Tide Water No. 12-A M. Thompson, 3,657-89 feet, 60 bbls. Ward Oil Co. No 38 E. E. Thrash, 3,779-3,814 feet, 60 bbls.

Smith County—Joiner Area

Sinclair Prairie No. 17 G. Patterson, 3,681-3,703 feet, 40 bbls. Sun Oil Co. No. 38-B H. A. Pace, dry and abandoned at 3,739 feet. Texas Co. No. 17 J. W. Wilson, abandoned location.

Upshur County—Longview Area

Dean Bros. No. 11 Victory, 3,614-15 feet, 40 bbls. Ellis Oil Co. No. 23 C. J. Mackey, 3,722-23 feet, 40 bbls. General American No. 16 T. Wells, 3,714-15 feet, 70 bbls. M. M. Johnson No. 10 F. Williams, 3,704-07 feet, 30 bbls. W. L. Pickens No. 14 T. Wells, 3,714-16 feet, 38 bbls.

EAST CENTRAL TEXAS COMPLETIONS

(24-hour gauges)

Cherokee County

Mercia Oil Co. No. 1 Cherokee Development Co., dry and abandoned at total depth of 5,333 feet.

Anderson County

In the Long Lake field, F.H.E. Oil Co. No. 2-A J. H. Morrow, 2,040-5,368 feet, 115,000,000 feet gas; H. L. Hunt No. 1 W. J. Moore, 5,261-5,361 feet, 78 bbls.

Franklin County

In the Talco field, Humble Oil & Refining Co. No. 3 Stewart, 4,170-4,297 feet, 270 bbls.

Henderson County

DeArman-McMillian & Hunt No. 1 J. M. Dowdy, dry and abandoned at depth of 3,105 feet.

Trinity County

Gassage & Green No. 1 Long Leaf Lumber Co., dry and abandoned at depth of 3,017 feet.

Titus County

Humble Oil & Refining Co. No. 8 A. W. Batson, 4,184-4,325 feet, 521 bbls.

West Texas Fields

(Continued from Page 94)

J. B. Walton, 2,860-3,155 feet, 503 bbls.; No. 129 Walton, 3,123-3,210 feet, 232 bbls.; No. 131 Walton, 2,838-2,945 feet, 1,001 bbls.

Yoakum County

Honolulu Oil No. 3 Bennett, 5,116-5,249 feet, 998 bbls. Mid-Continent Petroleum Co. No. 1 Bennett, 5,050-5,240 feet, 1,424 bbls. Texas Pacific Coal & Oil Co. No. 4 Bennett, 5,080-5,270 feet, 2,168 bbls.

WEST CENTRAL TEXAS COMPLETIONS

Jones County

Petroleum Producers No. 3 Jessie S. Milsap, flowing 440 bbls. in 19 hours after 40-quart shot in sand from 1,925-53 feet, total depth. Lewis Production Co. No. 12 Sayles, dry at total depth of 2,000 feet.

Shackelford County

Gordon & Pethybridge No. 1 M. O. Harbaugh and others, 6 bbls. per day in sand at 376-97 feet, total depth. J. F. Baker No. 1 Merrick Davis, pumped 43 bbls. per day after 20-quart shot in sand at 1,576-94 feet, total depth.

Callahan County

R. C. Lewis and others No. 1 W. A. Warren, dry at 300 feet, total depth.

Eastern Fields

(Continued from Page 88)

New Work

New locations released during the week include the following: In Calhoun County, Guy G. Boggess, on the Godfrey L. Cabot lease in Sherman district; Monongalia County, Philadelphia Oil Co., on the Stephen Tennant farm in Clay district. In Ritchie County, Bachelor, Choquill & Ray No. 11 J. L. McCullough in Clay district; J. W. Rowland on the M. D. Bennett heirs in Grant district.

In Wirt County, Carnegie Natural Gas Co. will deepen No. 2 W. G. Patterson, in Burnings Springs district, to test oil shales at 2,200-2,500 feet. In Wetzel County, same company has material on the ground on the Clarence Blatt farm and is drilling at 400 feet in No. 1 R. E. L. Simmons. Manufacturers Light & Heat Co was drilling at 300 feet on the Elizabeth Blatt farm. All three are in Proctor district.

In Lewis County, Hope Natural Gas Co. was drilling at 1,780 feet on the Amanda Summers farm, Skin Creek district. In Union district, Barbour County, same company had reached 3,350 feet in No. 7,800 Indian Fork Coal Co. In Clay County same company was drilling at 1,640 feet in No. 7,796 H. B. Davenport, Henry district. In Jefferson district, Nicholas County, same company was drilling at 810 feet in No. 7,805 Thompson Coal Land Co.

Puerto Rico Gasoline Use Establishes New Record

Shipments of gasoline to Puerto Rico from the mainland in 1937 were the heaviest of all time, 9 per cent above 1936 in quantity and 14 per cent above in value. Records show shipment of 531,362 bbls. of gasoline valued at $1,410,936 in comparison with 487,275 bbls. valued at $1,238,645 in 1936.

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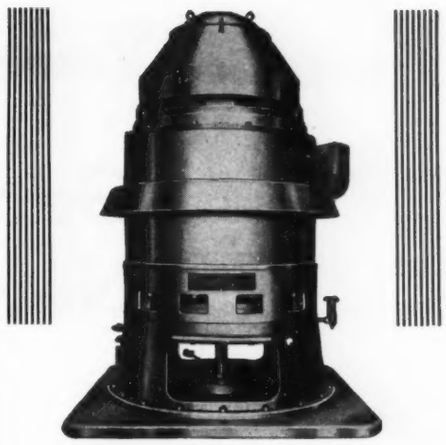

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Kansas Developments

By DAL DALRYMPLE

Geneseo Extended Half Mile; New Sector in Allen County

Activity in Kansas oil fields was greatly curtailed the past week, severe weather delaying completions and new work in many areas. Several wildcats held interest, however, and extension of one field seemed assured.

Cities Service Oil Co. No. 1 Zajic, NW NE SE 11-18-8w, gave promise of extending the Geneseo pool in Rice County more than one-half mile west. It found Arbuckle lime at 3,210 feet and was bottomed at 3,212 feet. Oil rose more than 3,000 feet in the hole in four and one-half hours and it was estimated good for 2,000 barrels of oil daily.

Another Rice County wildcat attracted attention at Sam Schneider and others No. 1 Sterling College, SE SW SE 28-20-8w, some 4 miles west of Wherry pool. A good showing of oil was reported in Conglomerate at 3,370 feet, total depth. Seven-inch casing was set preparatory to testing.

Showings of oil were reported at wildcats in Ellis and Sumner counties. Central Petroleum Co. and others No. 1 Foster, SE SE NW 33-11-16w, about 5 miles west of the Fairport field and in northeastern Ellis County, had Kansas City lime at 2,987 feet, with oil showings reported at 3,037-40 feet and 3,235-40 feet. The crew was drilling ahead in search of Arbuckle lime. E. B. Shawver and others No. 1 Stewart, SE cor. 4-32-3w, more than 10 miles west of Wellington pool in Sumner County, was reported to have recovered oil-stained core at 4,396-4,412 feet in Simpson series, and were coring ahead.

New wildcats include Twin Drilling Co. No. 1 Hall, NW SE NE 1-12-17w, about 2 miles southeast of Bemis pool in Ellis County; Pryor & Lockhart and A. M. Landon No. 1 DeSelms, NE cor. 3-25-11w, 1¾ miles south of the Zenith pool, Stafford County, and Westgate-Greenland Oil Co. and Amerada Petroleum Corp. No. 1 Johns, SE cor. 25-22-5w, about 5 miles northeast of Hutchinson in Reno County.

Daily allowable production in Kansas during March was set at 169,528 barrels by the Corporation Commission. This is 7,172 barrels less than the estimate of the United States Bureau of Mines. The February allowable was 176,700 barrels daily. Purchasers nominated only 165,000 barrels for March. E. G. Dahigren, director of oil and gas conservation, explained that 3,700 barrels were added to the composite withdrawal decline curve figure of 165,828 barrels. The McCullough pool of Butler County, exclusively owned by National Refining Co., will get 700 barrels more allowable; the Sullivan-Graham area of Russell County will get an increase of 1,700 barrels daily to be run to the United refinery at Russell, and an additional 1,300 barrels daily was allotted the Shallow Water pool of Scott County, solely owned by Atlantic Refining Co.

Torrey & Feaster No. 1 Mueller, SE cor. 29-21-12w, one-half mile northwest of the Sittner pool, Stafford County, set 7-inch casing preparatory to testing saturated Arbuckle lime at 3,594-3,600 feet, total depth. Operators were rigging up standard tools preparatory to bailing down and drilling plug.

Successful extension of the Neosho Falls play of northeastern Woodson County into northwestern Allen County was indicated at W. K. Jarvis and others No. 1 Fry, SE SE SW 2-24-17. A good showing of oil was reported in the first break in Mississippi lime, total depth 1,145 feet. Seven-inch casing was set preparatory to drilling in. It is 1 mile east of the Draper pool in Woodson County, producing from the same horizon. Other northwestern Allen County tests include Turner, Burke & Hamilton No. 1 Fitzpatrick, NW NW 12-24-17, and Ed Reed No. 1 well, NW SE 35-23-17.

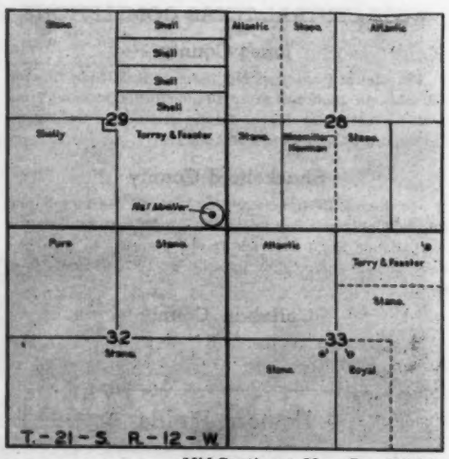
Wildcat Completions

Failures were recorded at all wildcats completed in Kansas the past week. Sinclair Prairie Oil Co. No. 1 Oeser, NE NE SE 17-16-11w, Barton County outpost, topped Conglomerate at 3,286 feet, missed Arbuckle lime, had Cambrian sand at 3,274-78 feet, total depth, and was dry and abandoned.

National Refining Co. No. 1 Brown Brothers, NW SE NE 22-23-2w, wildcat in Harvey County, had Arbuckle lime at 3,501-15 feet, total depth, and was dry and abandoned.

In Stafford County, Hipple No. 1 Moses, NW NW SW 9-22-13w, topped Arbuckle lime at 3,797 feet, had a hole full of water at 3,804-07 feet, total depth, and plugged back to 3,635 feet, perforated casing and acidized but was dry and abandoned.

Carter Oil Co. No. 1 Andress, C N half N half SE



Mid-Continent Map Co., Wichita

One-half mile northwest extension of the Sittner pool, Stafford County, is indicated in section 29-21-12w

2-21-13w, Stafford County, was abandoned when water intruded at 3,605-08 feet, total depth. Arbuckle lime was topped at 3,535 feet.

Ted Hamilton and others No. 1 Hitz, NE NE NW 23-22-13w, Stafford County, topped Arbuckle lime at 3,832 feet, had a sulfur odor at 3,851 feet, total depth, and was dry and abandoned.

Trees Oil Co. and Talbott No. 1 McMinn, NE NE NW 16-31-6, Cowley County, found Mississippi lime at 2,903 feet, total depth 2,995 feet, and was dry and abandoned.

Steinbuchel and others No. 1 McAdams, SW SW NE 28-29-1e, Sedgwick County wildcat, had a hole full of water in Arbuckle lime at 3,771-90 feet, total depth, and was abandoned.

In Clark County, Olson Oil Co. No. 1 Lehman, C SE SW 20-32-21w, topped Viola lime at 6,433 feet, had a slight showing of oil at 6,480-81 feet, found Arbuckle lime at 6,735 feet and was dry and abandoned at 6,807 feet, total depth.

J. J. Muth No. 1 Penney, C N half NE SE 29-14-18w, Ellis County, an old wildcat deepened from 315 to 350 feet, was abandoned.

Russell County

Phillips Petroleum Co. and others No. 2 Wineteer, NW NW SE 19-13-14w, was acidized and pumped 182 barrels of oil in the first four hours, making potential of 1,050 barrels. Top of Arbuckle lime was 3,267 feet, total depth 3,283 feet.

W. C. McBride, Inc., No. 2 Jellison, SE NE SW 19-13-14w, had Kansas City lime at 2,928 feet, pay 2,950-57 feet, total depth, and was acidized. It pumped 207 barrels of oil in the first four hours, making potential of 853 barrels of oil, with 39 barrels of water.

Russell County led the state with six new wells completed and an old well deepened and recompleted.

Smoky Hill Oil Corp. No. 6 Miller, SE NW NW 31-14-13w, had Gorham sand at 3,114-22 feet, total depth, and made potential of 1,872 barrels of oil.

Transwestern Oil Co. No. 13 Polcyn, NE SE SW 11-14-15w, made potential of 1,361 barrels of oil from Gorham sand topped at 3,237 feet, total depth 3,241 feet.

Gulf Oil Corp. No. 11 Hoffman, SE SW SW 31-15-13w, topped Arbuckle lime at 3,265 feet, had pay at 3,274 feet and was bottomed at 3,281 feet. After acid treatment, it pumped 295 barrels of oil in four hours and made potential of 1,772 barrels.

Gulf Oil Corp. No. 7 Mollie, NW NW SE 25-15-14w, found Arbuckle lime at 3,321 feet, total depth 3,323 feet, and swabbed 114 barrels of oil naturally in six hours. It was acidized two times, pumped 176 barrels of oil the first four hours and made potential of 1,000 barrels of oil.

Smoky Hill Oil Corp. No. 5 Guy Miller C, SW NW NE 31-14-13w, an old well, was deepened from 2,880 feet to 3,110 feet, made potential of 758 barrels of oil and was recompleted.

Rice County

A. H. Witt and associates No. 1 Reiff, NW NW SE 22-18-10w, Rice County, found Arbuckle lime at 3,270 feet and was bottomed at 3,277 feet. After treating with acid, it pumped 83 barrels of 41-gravity oil in three hours and made potential of 345 barrels.

Gulf Oil Corp. No. 3 Gossman, NW NW SE 8-21-7w, Wherry district, found Conglomerate at 3,324 feet, total depth 3,390 feet, and plugged back to 3,359 feet. It was shot and made potential of 101 barrels of oil.

Gerbrand-Pulse Drilling Co. and others No. 1 Sterling College, NW cor. 27-21-9w, was bottomed at 3,561 feet, plugged back to 3,349 feet, was shot and gauged 878,000 feet of gas. It had Misener sand at 3,318-36 feet.

Sinclair Prairie Oil Co. No. 6 Bolton, SW NW SW 31-18-7w, had Granite Wash at 3,845 feet, total depth 3,910 feet, and was completed as a water disposal well.

Barton County

It was a quiet week in Barton County, only one well being completed in a proven area. C. B. Davis and Gulf Oil Corp. No. 11 Steckel, SW SW SE 1-20-11w, Silica field, found Arbuckle lime at 3,263½ feet and was bottomed at 3,279 feet. After acid treatment, it was given an estimated potential of 200 barrels of oil, and completed as a minimum well.

Ellis County

Bridgeport Machine Co. No. 1 Klotz, C S half S half SE 33-12-16w, Ellis County, had a fishing job at 2,625 feet, plugged back to 2,500 feet, but skidded rig and drilled in new hole to 400 feet, where it was abandoned.

McPherson County

McPherson Oil & Gas Co. No. 5-K Chindberg, SE NW NW 32-18-2w, McPherson County, topped Kansas City lime at 2,325 feet and had pay at 2,363-68 feet, total depth. It was acidized and made potential of 40 barrels of oil daily.

Stafford County

Stanolind Oil & Gas Co. and others No. 2 Mamie Volker, NW SW NE 23-24-11w, Stafford County, found

Simpson formation at 3,785-91½ feet, total depth, and flowed 199 barrels of oil in the first four hours, being completed for potential of 1,134 barrels of oil.

Atlantic Refining Co. and others No. 1 Hitz, SE SE NE 12-22-13w, found Arbuckle lime at 3,705 feet, total depth 3,725 feet, had a sulfur odor and was dry and abandoned.

Estimated Daily Production

Estimated daily production for Kansas for the week ending February 26, and for the week preceding, was as follows:

	Barrels	
	Feb. 26	Feb. 19
Oxford City	2,350	2,400
Burrton	11,125	11,075
Ritz-Canton	6,175	6,575
Graber	2,675	3,025
Hollow-Nikkel	3,000	3,400
Lerado	1,075	1,375
Voshell	2,475	2,950
Wellington	2,125	2,550
Ellsworth County:		
Lorraine	2,350	2,900
Other pools	1,320	1,300
Rice-Barton counties:		
Bloomer	3,200	3,250
Chase	5,725	5,675
Geneseo	1,825	2,625
Raymond	900	1,025
Silica	15,200	16,100
Silica—South	2,850	2,950
Keesling	675	975
Wherry	3,575	3,675
Miscellaneous Rice	3,910	3,875
Miscellaneous Barton	3,955	3,950
Russell County:		
Fairport	1,495	1,930
Gorham	1,500	1,770
Russell	2,320	1,900
Sullivan	5,875	5,825
North Trapp	10,480	9,030
Miscellaneous Russell	7,035	7,840
Sedgwick County:		
Valley Center	1,040	1,045
Miscellaneous	2,765	3,000
Ellis County:		
Bemis	4,850	6,575
Miscellaneous	2,795	3,490
Kingman County	640	480
Stafford County	2,835	3,665
Greenwood County	9,700	9,700
Butler County	16,000	16,050
Other fields	25,335	24,850
Total Kansas	171,150	178,800

Sumner County

E. B. Shawver No. 1 Post, NE SW NE 34-34-2e, Padgett area, Sumner County, topped Chat pay at 3,458 feet and was completed at 3,487 feet, total depth. It was estimated good for 40 barrels of oil and 15 barrels of water daily.

Magnolia Petroleum Co. No. 1 Schammerhorn, C E half SW SW 2-30-4w, in the Anness district, had Wilcox sand at 4,403 feet, Arbuckle lime 4,515 feet, the hole filled with water at 4,534 feet, and it was bottomed at 4,611 feet, where it was completed as a water disposal well.

Cowley County

E. B. Shawver No. 1 Blood, NW NW SW 2-30-4e, Cowley County, had Bartlesville sand at 2,808 feet, was bottomed at 2,817 feet, plugged back to 2,815 feet, was shot and pumped 15 barrels of oil daily.

Sedgwick County

National Refining Co. No. 2 fee, C NE SE 36-27-2e, Sedgwick County, topped Lansing lime at 2,039 feet and was dry and abandoned at 2,082 feet, total depth.

Butler County

Deep Rock Oil Corp. No. 7 Hill, CSL NW NW 32-26-5, Butler County, was acidized and pumped 35 barrels of oil daily. It had Wilcox sand at 2,648-51 feet, total depth.

Polhamus No. 7 Semisch, SW cor. 33-27-7, found Mississippi lime at 2,812 feet, had a hole full of water at 2,880 feet, total depth, and was abandoned.

Nebraska Failure

Arab Petroleum Co. No. 1 Ogle, SE cor. 9-1n-14e, southeastern Nebraska wildcat, which has been standing idle for some time, was dry and abandoned at 3,424 feet, total depth. It found Wilcox sand at 3,255 feet, Platteville 3,269 feet, Granite 3,423 feet.

Gulf Coast Fields

(Continued from Page 86)

phur Co. recompleted the discovery well, No. 1 Jo. O. Broussard, a distillate producer, and it is flowing 25 bbls. of pipe line oil daily from perforated casing at 8,030-34 feet. At the close of the week, a trace of salt water was noticeable in the oil.

Lafitte Extended

The Lafitte field, Jefferson Parish, was extended several hundred feet with the completion of Texas Co. No. 1 Marrero Land & Investment Co. The completion was made from a screen setting at 9,700-10,275 feet, and the well flowed 1,783 bbls. per day through a three-eighths inch choke, with tubing pressure 1,525 pounds. Location is in section 20-17s-24e.

Humble Oil & Refining Co. No. 11 Orleans Levee Board, the discovery well of the Potash dome, Plaquemines Parish, completed in September at a total depth of 696 feet, was placed on the pump the past week and produced 30 bbls. in 12 hours. The well is being pumped only 12 hours each day.

In St. Martin Parish, Texas Co. No. 4 State-Lake Mongoulois, section 14-10s-9e, made a 15-minute drill stem test at 7,713-23 feet and recovered eight stands of salt water. A 30-minute test from 7,631-46 feet recovered 180 feet of 34-gravity oil and 1,020 feet of salt water. It is drilling ahead in shale below 7,796 feet.

On the South Crowley Prospect, Acadia Parish, the progress of Humble Oil & Refining Co. No. 1 Boyd Finch was being watched as an attempted drill stem test at 8,140-75 feet failed, due to the testing tool slipping.

Along the Conroe Trend, in the western part of the Beauregard Parish, near the Texas state line, Republic Production Co. is moving in material for No. 1 Lutcher Moore Lumber Co., section 10-6s-13w. It is located on the same trend as the Spurger field in Tyler County and the Villa Platte field in Evangeline Parish and will no doubt be drilled to the Cook Mountain formation.

Continental Oil Co. staked location for another test in the Abbeville field, Vermilion Parish, being No. 1 Amar Hebert lease, a south offset to the discovery well in section 67-12s-3e. Location was also made by H. B. Tietje for No. 1 Emily Guidry located on a

UNITED STATES MAP

Shows oil fields in green, gas fields in red, with official field names as designated by the various state nomenclature committees. States are subdivided into counties with principal towns and cities. Large scale insets showing the active oil areas:

"A" Michigan Field
"B" Illinois Basin
"C" Western Kansas
"D" Favorable and unfavorable oil areas of the United States
"E" Alaska Fields
"F" Rodessa Area
"G" Texas Panhandle
"H" Corpus Christi Area
"I" Seminole-Fitts Area
"J" Bakersfield Area
"K" Los Angeles Area
"L" Permian Basin

Major Map 1"—40 miles. Insets 1"—8 miles. Size 48" x78"

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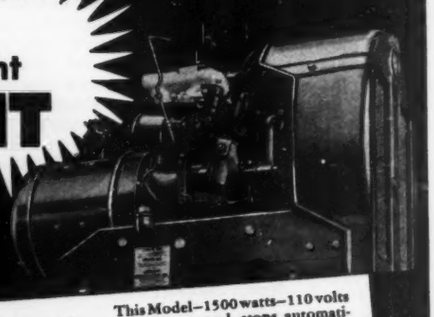

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seven-acre lease in section 65-12s-3e, about three-quarters of a mile north of the discovery well.

COMPLETIONS ON TEXAS COAST

Completions of the week with pay sand record or total depth, and initial 24-hour production, follow:

Brazoria County

Hastings field: C. Andrade No. 1 Blumer, oil sand 6,092-6,100 feet, 627 bbls., quarter-inch choke. Jay Simmons No. 3 C. H. Alexander, 6,086 feet, perforated casing 6,060-80 feet, 495 bbls., quarter-inch choke. Lockridge field: Shell Petroleum Corp. No. 4-B Ramsey, 6,369 feet, 90 bbls., 13 hours, 13/64-inch choke. Manvel field: Texas Co. No. 28 Houston Oil Field Association, 5,680 feet, 575 bbls., quarter-inch choke.

Chambers County

Anahuac field: Gulf Oil Corp. No. 9 Wilcox, 7,123 feet, 605 bbls., quarter-inch choke. Humble Oil & Refining Co. No. 20 Clark, 7,170 feet, abandoned.

Galveston County

Dickinson field: Atlantic Refining Co. No. 1 Deats, 9,081 feet, perforated casing 9,033-37 feet, 260 bbls., quarter-inch choke. Humble Oil & Refining Co. No. 1 M. H. Kreisle, 9,197 feet, perforated casing 8,698-8,702 feet, 288 bbls., quarter-inch choke. Pure Oil Co. No. 4-B J. W. Shelor, 8,006 feet, perforated casing 7,984-88 feet, 467 bbls., quarter-inch choke.

Jefferson County

Nome field: Sun Oil Co. No. 1 Gordon, 6,206 feet, abandoned.

Liberty County

Hardin field: Jack Frazier No. 1 W. McMurtry, 7,794 feet, plugged back 7,646 feet, perforated casing 7,610-17 feet, 377 bbls., quarter-inch choke. Gulf Oil Corp. No. 1 J. H. Cessna, 7,583 feet, perforated casing 7,574-81 feet, 503 bbls., quarter-inch choke.

Harris County

Fairbanks field: Amerada Petroleum Corp and Stanolind Oil & Gas Co. No. 1 Maggie Peters, 6,894 feet, perforated casing 6,823-26 feet, 21 bbls. distillate in 23 hours, various chokes, tubing pressure 1,900 pounds, casing pressure 2,100 pounds. Satsuma field: Amerada-Stanolind Oil & Gas Co. No. 3-C Dopslauf, 6,839 feet, perforated casing 6,819-22 feet, 5 bbls. in 16 hours, 12/64-inch choke. Tomball field: Humble Oil & Refining Co. and Magnolia Petroleum Co. No. 1 Winslow, 5,573 feet, perforated casing 5,568-72 feet, 511 bbls., quarter-inch choke.

Polk County

Livingston field: Humble Oil & Refining Co. No. 12 Granbury, perforated casing 4,156-60 feet, 120 bbls., quarter-inch choke.

Canadian Gas Production In 1937 Shows Decrease

OTTAWA, Ontario.—Natural gas production from all Canadian fields in December totaled 3,634,389,000 feet compared with 2,882,059,000 feet in November and 3,291,649,000 feet in December, 1936. For the calendar year 1937 the output amounted to 27,918,530,000 feet against 28,113,348,000 feet the previous year.

Imports of mixed (natural and artificial) gas into Canada in December amounted to 8,590,000 feet valued at $6,185 compared with 9,220,000 feet at $5,532 in November. Imports for the entire year were 114,275,000 feet valued at $74,799.

Michigan Field Report

By O. C. PRESSPRICH

Mammoth Acquires Interest in Latest Pool in Michigan

SAGINAW, Mich., Feb. 28.—Mammoth Producing & Refining Co., largest Michigan independent oil operator, closed the year's largest land transaction in Michigan when it purchased all interests held by Michigan Devonian Petroleum Co. in Edenville Township of Midland County, scene of what may be the industry's biggest Michigan discovery since the Buckeye strike in July, 1936. The deal involved about 1,500 acres in the vicinity of Chapman Oil Co.'s discovery well, and in the well itself. Mammoth previously was reported to have paid $5,000 for the west offset lease of the Edenville discovery well, where plans for a well are moving forward, despite an offer a short time after purchase of $20,000 for the same property.

Natural producers during the week in the Buckeye field added 1,200 bbls. daily, while acid treatments stepped up production in the same field 700 bbls. Bentley Township of Gladwin County added three potential producers, one a 100-bbl. natural well, which is scheduled for acid, and two holes testing with favorable showings. Secord Township of Gladwin County added another test and was swabbing for acid treatment.

In other parts of Michigan dry holes were encountered, including one in Edenville Township, Midland County, scene of Michigan's latest strike. The Edenville failure was a test in section 9 given a nitroglycerin shot after the Chapman discovery strike in section 27, and is located about 2 miles north and 1 mile west of the discovery.

North Buckeye

Upper Buckeye added two natural producers and two acidized wells, headed by American Drilling Co. No. 4 Soldan, NW SW SE section 12-18n-1w, a 600-bbl. natural producer, near the eastern border of the north Buckeye pool. Sun Oil Co. added two producers on its prolific Strohkirch leases. Its No. 10 Strohkirch, SW SW SW section 3-18n-1w, developed 400-bbl. daily production after acid, and was considered a highly favorable test as a northwest location in the north Buckeye pool. The same company's No. 6 Strohkirch, SW NW NW section 10-18n-1w, was a 300-bbl. natural producer. H. H. Hart No. 3 Soldan, NW NE SE section 12, was acidized and developed production of 75 bbls. daily.

South Buckeye

One natural producer, two acidized wells, and a favorable test to be completed summarized south Buckeye development. Voorhees Drilling Co. No. 3 Fritzwater, NE SE NE section 26-18n-1w, gauged 250 bbls., natural flow. S. & S. Oil Co. No. 3 Fritzwater, NE SE NE section 26-18n-1w, produced 200 bbls. daily after acid. Bell & Blunt No. 2 McMahon, SW NW SW section 25-18n-1w, flowed 100 bbls. daily after acid, increasing its production only slightly over its natural run of 75 bbls. Hanners Development Co. had indications of a favorable producer in its No. 2-A State, NE SE SW section 35-18n-1w, where 3,000 feet of oil filled the hole, and was scheduled for acid. None of the south pool developments of the week extended proved boundaries, all being on inside locations.

Bentley Township

Three tests apparently were added to Bentley production for the week, one having developed 100-bbl. daily production, while two others had favorable indications and were preparing for acid treatment. Mammoth Producing & Refining Co. No. 1 LaFurgey, SW SW SE section 20-17n-2e, reported last week with a hole full of oil, developed 100 bbls. natural flow, and was being tubed for treatment. The same company's No. 1 Lake, SE SW NE section 20-17n-2e, reported a hole full of oil, and was scheduled for acid treatment. Gulf Refining Co. No. 1 State, SE SE SW section 20-17n-2e, was testing after acid. The three apparent producers are located in the heart of semiproved territory.

Secord Township

Sun Oil Co. No. 1 Conrad, NW NW SW section 12-19n-1e, only test under way in Secord, has swabbed 50 bbls. during tests, and was preparing for acid treatment.

Isabella County

Pure Oil Co. continued to add to its prolific Broomfield territory with No. 11 Willie, NW NW NW section 4-14n-6w, which was acidized to a production of 520 bbls. daily. The test compared favorably with surrounding producers.

Midland County

Although the scene of a large land transaction through which Mammoth Producing & Refining Co. purchased all interests of the Michigan Devonian Petroleum Co., Edenville Township, activity centered mainly on preparations to explore the district thoroughly as soon as weather and highway conditions permit. Meantime Chapman Oil Co.'s discovery well in section 27, in which Mammoth now holds an interest, continued to produce favorably. A flurry of drilling activity is expected in various parts of the township on arrival of spring, with a majority of locations near the discovery sector held by Mammoth.

A test of possibilities about 2 miles north and 1 west of the discovery well, which was under way some time before Chapman's well came in, resulted in failure when Sun Oil Co. No. 1 Consumers Power Co., NE NE NE section 9-16n-1w, proved dry. The test was given a shot, but failed to produce and will be abandoned.

Allegan County

Michigan Devonian Petroleum Co. No. 4 Brower, SW SE SE section 17-4n-13w, was increased from a 40-bbl. natural producer to 300 bbls. daily after acid, and the same company's No. 2 Sebright, SE SE SE section 17-4n-13w, an eastern offset, was drilling below 250 feet. Muskegon Oil Co. No. 3 Goodman, NW NW NW section 22-4n-13w, developed a 600-bbl. producer after acid.

Mecosta County

Sun Oil Co. No. 1 Robart and others, N half NE NW section 29-16n-7w, drilled into water below 3,800 feet with no favorable shows, and will be abandoned.

Muskegon County

Muskegon County's only test under way was completed dry. It was West Michigan Consumers Co. No. 1 Herman, center NW section 35-10n-14w. Originally a gas test, it was drilled to the Dundee for oil.

Newaygo County

Mid-States Corp. No. 1 Eichenberger, NE SE NW section 7, Barton Township, drilled into water past 4,450 feet, and will be plugged and abandoned.

Four Permits for Edenville

State licenses for four more tests in Edenville Township, Midland County, scene of Michigan's most recent wildcat strike, were issued during the week, topping the list. Three of the four were issued to Garfield Petroleum Co. for explorations in section 27, the discovery area, while the fourth went to M. L. Jorgensen for a test in section 25.

North Louisiana, Arkansas

By GEORGE WEBER

Main Interest in Arkansas Tests; Allowables Revised

SHREVEPORT, La., Feb. 28.—Attention of operators in this district in the past week was attracted mainly to southern Arkansas where a number of important tests in wildcat territory, and in the Buckner area, have reached critical stages. One wildcat showed disappointing results, and others are about to be given tests. Elsewhere the week's developments were marked by several completions in active drilling fields and minor changes in allowables in north Louisiana and Arkansas.

Arkansas Wildcat

The Kerr-Lynn Oil Co. No. 1 Barnett, in section 14-17-20, east of Magnolia, the principal object of interest during the week, failed to fulfill expectations on a production test. The wildcat cored a hard, slightly porous lime at 7,659-64 feet several weeks ago, reported to be saturated. After setting 7-inch casing at 7,052 feet the test was cored deeper to 7,730 feet. A drill stem test made at 7,664-72 feet showed recovery of 5,400 feet of salt water and sulfur water in 27 minutes, with three-eighths inch chokes at top and bottom.

The salt water is believed by operators to be coming from the bottom few feet of sand cored, and after running a Schlumberger test operators plan to run 5-inch casing to bottom and perforate for further production tests. The test has brought leasing activity in Columbia County to a new high, and together with several other tests now drilling in Columbia and Lafayette counties, the activity has brought south Arksansas to the front as a possibility for considerable oil exploration.

Buckner Tests

The Buckner field of Columbia County is believed due for an extension to the southwest. Although no late information is available on the test, Taubel and others No. 1 Tatum, three-quarters of a mile southwest of Standard Oil Co. No. 1 McKean producer, is believed coring the field sand at around 7,200 feet. The outpost is located across the line in Lafayette County. Results of this test are considered of prime importance, due to the fact that it is the first extension test to be drilled since the discovery well was brought in several months ago.

Also in the immediate vicinity of the Buckner well are two other outposts, being drilled by the Standard Oil Co. of Louisiana, major lease holders in the area. No. 1 Bodcaw-Barbara, in section 18-16-22, is approaching the field horizon, at last reports, drilling below 6,000 feet. Standard Oil Co. No. 1 Crone, in section 8-16-22, is drilling below 5,150 feet.

Still another area is being brought into the limelight in south Arkansas. East of the Kerr-Lynn test, Standard Oil Co. of Louisiana is drilling at a shallow depth in No. 1 Phillips, a wildcat in section 15-17-19. Farther southeast, in southern Union County, a wildcat is spudding several miles southeast of the Shuler field. This is E. G. Bradham No. 1 Robbins in section 12-19-16. It will sustain interest in the district as it progresses.

Shuler Deep Test

As the most active area in Arkansas, the Shuler field is adding to the current interest in that state. Marine Oil Co. No. 4 Justiss, in the center of Lot 7, NW section 18-18-17, topped the Jones sand at 7,519 feet and cored to the top of the Big lime at 7,624 feet. Seven-inch casing was set at 7,750 feet, the total depth. Only one well is producing from the Big lime, or Reynolds lime, as it is termed at Shuler. No completions were made during the week, but a number of tests are on the Jones sand, slated for early completions.

Miller County

The Rodessa extension of Miller County, Arkansas, gained one new producer during the week. Sam Tillingsworth No. 1 Treadway, section 10-20-28, made an initial production of 20 bbls. per hour through a 1-inch choke, with casing pressure of 300 pounds.

New allowable schedules for the state give the Miller County Rodessa field a total of nearly 9,000 bbls. per day. The new figures, while lower than the former 10,500-bbl. corrected allowable total, will permit some wells to increase production, and the net result is expected to be a slight increase in actual production. Production from the field has averaged 7,900 bbls. daily during recent weeks, due to the fact that many of the wells in the field could not make their allowables.

The same state schedule released by the Arkansas Board of Conservation reduces the top allowable in the Shuler field from 800 bbls. to 700 bbls. per well from the Jones sand. This change follows the doubling of the Jones production allowable on February 1.

Marion County Completions

In the Marion County, or Jefferson-Lodi section of the Rodessa field, in Texas, activity is gaining weekly. The present most important development is a west-edge well in the Jefferson sector, Phillips Petroleum Co. No. 1 Pruitt-Lockett, which is testing with casing set at 6,157 feet.

Arkansas-Louisiana Gas Co. No. 3 Wade Houston, in the Coy Survey, was completed for an initial production of 469 bbls. per day through a quarter-inch choke, with tubing pressure of 400 pounds and casing pressure of 625 pounds. Total depth is 6,099 feet.

Rodessa Outpost Test

In the Caddo Parish portion of Rodessa, a north outpost is being swabbed in an effort to extend the field three-fourths mile in that direction. F. W. Burford No. 1 Brown, NE cor. SE section 5-23-15 has 7-inch casing set at 6,124 feet and is bottomed at 6,130 feet. The crew cored saturated lime, and has been swabbing for two days in an effort to bring in a producer. The hole had been swabbed down to below 4,000 feet at latest reports, and was showing oil. The lime will be acidized.

Lisbon Completions

The Lisbon field gained three producers during the past week, bringing the total to nine in two weeks. T. L. James No. 2 Fowler, section 32-21-4, made 460 bbls. in 11 hours on a half-inch choke with tubing pressure of 150 pounds. Tubing was set on a packer. Total depth is 5,190 feet.

A. O. Olson No. 7-A Patton Estate, section 30-21-4, gauged 65 bbls. per hour through a 24/64-inch choke with tubing, set on a packer, showing a surface pressure of 300 pounds. Total depth is 5,082 feet.

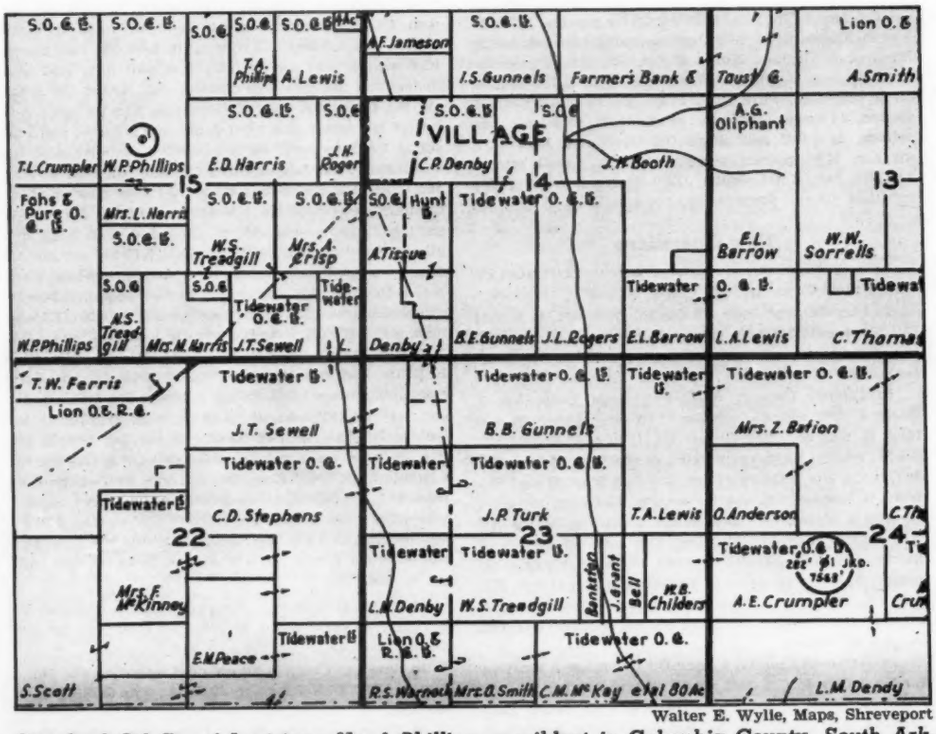
Magnolia Petroleum Co. No. 1 Pollock, section 5-20-4, made 26 bbls. per hour on a half-inch choke. Saturated lime was cored at 5,309-13 feet and 5,324-27 feet, total depth.

In the south edge of the Bull Bayou field, DeSoto Parish, A. P. Barrett No. 1 Jal Drilling Co., section 7-11-11, came in for 15 bbls. per day through perforations at 2,682-2,768 feet.

Cotton Valley Wells

The deep Bodcaw sand paid off in three producers in the Cotton Valley field of Webster Parish. Magnolia Petroleum Co. No. 2 Mixon, section 22-21-10, gauged

(Continued on Page 114)



Walter E. Wylie, Maps, Shreveport

Standard Oil Co. of Louisiana No. 1 Phillips, a wildcat in Columbia County, South Arkansas, near Village. The test is about 2½ miles northwest of a wildcat drilled by Tide Water on the Crumpler lease in section 24

Central West

By STAFF CORRESPONDENT

Centralia Area Attractive to Many Illinois Operators

MATTOON, Ill., Feb. 28.—Fourteen completions, 11 of them oil wells with a combined initial production of 5,460 bbls., and three dry holes; a number of near completions, and the lively drilling campaign in the pool on the western outskirts of the city of Centralia were the features of the week in the central basin fields.

The completions of the week were as follows:

Pure Oil Co. No. 1 M. Mitchell, C N half SE SE section 5-2n-8e, Clay County, had pay at 3,020-25 feet, total depth 3,000 feet. It flowed 190 bbls. of oil through five-eighths inch choke in 24 hours, casing pressure 225 pounds, tubing pressure 60 pounds.

Pure Oil Co. No. 3 Brissenden, SE NW NE section 8-2n-8e, found pay at 2,992-97 feet and 3,025-28 feet, total depth 3,050 feet. It swabbed and flowed 165 bbls. through 1-inch choke, casing pressure 225 pounds.

M. O. K. Corp. No. 2 Bemis, SE SE NW section 14-3n-8, Clay County, is an abandoned location.

Pure Oil Co. No. 2-B Travis-B, NW NW NW section 33-3n-8e, Clay County, flowed 290 bbls. in 24 hours through tubing from pay at 2,962-70 feet and 2,974-88 feet, casing pressure 275 pounds and tubing pressure 45 pounds.

Bonnie Oil & Gas Co. abandoned the location for No. 1 Walker, SE SE NW section 21-4n-8e, Clay County.

Connery and others No. 1 Barth, 895 feet from south and 1,100 feet from east lines of SW quarter section 12-1n-1w (corrected location), had Benoist sand at 1,375-93 feet, shot it with 10 quarts. The well pumped 130 bbls. of oil and 15 bbls. of water the first day, and 370 bbls. of oil and 52 bbls. of water in three days. It is in the Centralia field in Clinton County. Henshaw & Whisenant in NW cor. SW SW section 13-1n-1w, Clinton County, found salt water in Benoist sand at 1,435-43 feet, total depth, and abandoned the test. Santa Fe Oil & Gas Co. No. 3 Robbins, C E half SW SE section 5-1n-3w, had sand at 981-93 feet, which was shot with 10 quarts, the well producing 75 bbls. on the pump the first 24 hours.

In Hamilton County, Carpenter and others No. 1-A Clark, NW NW SW section 32-3s-5e, was abandoned at 2,160 feet with no showings of oil.

In Jefferson County, A. H. Carpenter and others No. 1 Skinner, SW NW NE section 36-4s-2e, is an abandoned location.

In Montgomery County, Schlossberg & Sigel (Bill Cassidy) No. 1 Nieman, NW SE SW section 29-8n-5w (corrected location), was dry at 849 feet, and was plugged back to 717 feet, where it also tested dry. The hole was abandoned.

Pure Oil Co. No. 1 C. T. Montgomery-B, C E half SE NW section 4-3n-9e, with pays at 2,940-45 feet and 2,947-50 feet, total depth 3,000 feet, flowed 1,272 bbls. of oil in 24 hours.

Pure Oil Co. No. 3 C. T. Montgomery-B, C W half SW NW section 4-3n-9e, total depth 3,010 feet, flowed 1,896 bbls. the first 24 hours from pay at 2,931-40 feet.

Pure Oil Co. No. 8 Palmer-Taylor, NW NE SE section 5-3n-9e, flowed 779 bbls. of oil the first 24 hours from pay at 2,940-46 feet and 2,965-67½ feet, total depth 3,000 feet.

J. I. Staley No. 1 Mitchell, SW cor. SE SE SE section 8-3n-9e, was shut down indefinitely at 2,576 feet.

Pure Oil Co. No. 3 Frost, C W half NW SW section 9-3n-9e, swabbed and flowed 81 bbls. of oil in 24 hours from pays at 2,945-47 feet and 2,953-58 feet.

Ypsilanti Oil Co. abandoned the location for No. 1 Russell & Ring, NW cor. SW NW section 16-3n-9e, and for No. 1 Dugan, C E half SE NE section 17-3n-9e.

Pure Oil Co. No. 4 C. T. Montgomery-A, NW cor. NE NW NE section 17-3n-9e, swabbed and flowed 97 bbls. of oil from pay at 2,943-47 feet, 2,953-61 feet and 2,975-77 feet, total depth 3,000 feet.

Ritz Oil Co. No. 1 Jenkins, SE NW NE section 17-3n-9e, had pay at 2,945-58 feet. It was acidized with 5,000 gallons and flowed 485 bbls. of oil in 24 hours. It had flowed 90 bbls. of oil naturally the first 12 hours.

Mammoth Producing & Refining Co. No. 1 Brace, SW SE NW section 28-3n-9e, was deepened from 3,052 feet, and it was found the pay extended to 3,060 feet, total depth 3,064 feet. At the new total depth the well flowed 783 bbls. of oil the first 24 hours.

Near Completions in Richland

A number of wells in various parts of the Basin were closed to completions as oil wells or failures.

In Richland County, Pure Oil Co. No. 4 Snyder, C E half SW NW section 3-3n-9e, found pay at 2,960-70 feet, total depth 3,000 feet. It swabbed 131 bbls. of oil in 24 hours but was to be acidized. Pure Oil Co. No. 7 Coen, C E half SE NE section 4-3n-9e, had saturated dolomite at 2,982-91 feet and a small showing of oil. It will be acidized. Pure Oil Co. No. 2 Fleming-A, CSL SW SE SE SE section 8-3n-9e, was acidized with 5,000 gallons in dolomite at 2,945-70 feet, and later swabbed dry. It was shut down for orders. Pure Oil Co. No. 12 Coen, C E half SW NW section 9-3n-9e, topped the Roseclaire formation at 2,915 feet and drilled to 3,000 feet. It swabbed 30 bbls. of oil in 15 hours, and will be acidized. Kapshull No. 1 Patterson, NE NW NW section 16-3n-9e, was drilled to 3,112 feet, and is shut down for orders. It had no oil showings.

DeKalb Syndicate No. 1 Shafer, NW SE NE section 17-3n-9e, tested Cypress sand at 2,595-2,616 feet. Five hundred feet of water and a small showing of oil resulted. The crew was rigging up standard tools to complete the well. Illinois Canadian Corp. No. 1 Padgett, C SW NE NE section 17-3n-9e, was acidized at 2,595-2,616 feet with 4,000 gallons, but swabbed only water, and is shut down for orders. Ypsilanti Oil Co. No. 1 Tolliver, C NE quarter section 17-3n-9e, was acidized with 4,000 gallons and was swabbing. Parshall & Graham No. 1 Miller, SW NE NE section 17-3n-9e, was drilling at 2,963 feet with 2,300 feet of oil in the hole. Pure Oil Co. No. 2 Burr, NE SW NE section 17-3n-9e, had pay at 2,941-55 feet and was drilling at 2,067 feet. Pure Oil Co. No. 1 Rins-Burr, SE cor. NW quarter section 17-3n-9e, found pay at 2,947-58 feet, total depth 3,000 feet, and was being swabbed down preparatory to acidizing.

New Operations

Locations and first reports of new work started included the following:

In Clay County, Pure Oil Co. No. 1 Tehick, C N half SW SW section 4-2n-8e, rig up; Pure Oil Co. No. 1 Wilkin, 496 feet from W and 330 from S lines of SW quarter section 28-3n-8e, rig.

In Clinton County, Shell Petroleum Corp. No. 2 Koelmil, NW SW SW section 1-1n-1w, rigging up rotary; D. Fox and Ray Brown No. 1, near C E half NE SE SE section 12-1n-1w, moving in material; Adams Oil & Gas Co. No. 1 Geary Heirs, 320 feet from N and 990 from W lines of SE quarter section 13-1n-1w, location; Rourke & Morse No. 1 Lanfield & Wellman, SW SW SE NE section 13-1n-1w, location; Fox and others No. 1 Storer, SW NW NE NE section 13-1n-1w, rigging up rotary; J. D. Reynolds No. 1 Huntington and others, NE NW SE NE section 13-1n-1w, location; John Pugh and others No. 1 Phoenix, NW NW SE NE section 13-1n-1w, rigging up rotary.

In Jefferson County, Carter Oil Co. made a location for No. 1 Copple, C E half SE SE section 9-1s-2e.

In Richland County, Ritz Oil & Gas Co. No. 2 Paul Jenkins, near C CW NW NE section 17-3n-9e, moving in rotary tools; Pure Oil Co. No. 9 Palmer, Taylor C E half NW SE section 5-3n-9e; rig.; Pure Oil Co. No. 3 C. T. Montgomery-B, C S half NW NW section 4-3n-9e, rig; No. 13 J. D. Coen, C W half SW NE section 4-3n-9e, location; No. 14 Coen, C W half NE SW section 4-3n-9e, rigging up rotary; Pure Oil Co. No. 4 Frost, C E half NW SW section 9-3n-9e, location.

In Marion County, Thompson and others No. 1 Baker, C SW NW SW section 9-1n-1e, rotary moved in.

In Effingham County, E. L. Dee and others made a location for No. 1 Carroll, C NE NE SE section 16-2s-1e. Graham & Duncan spudded No. 1 Rickers, near C N half SE NW section 18-6n-7e, and then shut down. Fred Kroger spudded and then shut down No. 1 Schoenhoff, C SE NW SW section 5-8n-7e. This will be a rotary test later.

In Clinton County, Penn Illinois Oil Co. made a location for No. 1 Molan, C SW SW SW section 28-2n-1w.

Wildcats and Extension Tests

W. C. McBride, Inc., was drilling at 1,235 feet in No. 1 Butler, SW SW SE section 30-4n-2w, in Bond County.

Vermilion Oil Co. No. 1 J. B. Smith estate; 624 feet from W line and 1,176 from S lines of NW quarter section 20-3n-8w, set 7-inch casing at 3,005 feet, total depth 3,010 feet, and was rigging up standard tools. It topped the Roseclaire formation at 2,996 feet.

A lively campaign of drilling is taking place on the western outskirts of the city of Centralia, but in Clinton County. Centralia lies in Marion County, close to the Clinton line. Adams Oil & Gas Co. is drilling at 1,164 feet in No. 1 Felton, NW SW NW section 1-1n-1w. Shell Petroleum Corp. and Adams Oil & Gas Co. No. 1 Criley-Felton, SW SW NW section 1-1n-1w, had 600 feet of oil in the hole after a 10-quart shot at 1,355-65 feet, and the crew was cleaning out. Shell Petroleum Corp. No. 1 Koelmil, SE SW SW SW section 1-1n-1w, had Benoist sand at 1,341-73 feet and set 7-inch casing at 1,339 feet. Shell Petroleum Corp. No. 1 Pitchford, NE NW SW section 1-1n-1w, found Benoist sand at 1,332 feet and drilled to 1,365 feet. Oil rose in the hole 950 feet. Seven-inch casing was set at 1,331 feet and plug had been drilled and the crew was cleaning out. Adams Oil & Gas Co. No. 4 Schmitz, NE NE SE section 2-1n-1w had a hole full of salt water at a total depth of 1,351 feet and pipe set at 1,321 feet will be re-cemented. Benoist sand lies at 1,326-47 feet. Adams Oil & Gas Co. No. 1 E. B. Marshall, SE NE SW SW section 12-1n-1w was spudded. Connery and others No. 1 Feldman, SW cor. NE SE SW section 12-1n-1w was drilling at 1,240 feet. Lilly and others No. 1 Siegler, NW cor. NE NE SE section 12-1n-1w was drilling at 1,085 feet. Shell Petroleum Corp. No. 1 Buehler, NE cor. NE NW NW section 12-1n-1w was drilling at 1,230 feet. Thompson & Self No. 1 Hausman, SE NW NE section 12-1n-1w was drilling at 941 feet. John Pugh No. 1 Copple, NW SW NE NE section 13-1n-1w, had Benoist sand at 1,357-75 feet and was rigging up standard tools. Rourk & Moore No. 1 Quick, SW cor. NW NE SE section 13-1n-1w, was drilling at 400 feet. A. B. Ryan No. 1 H. Kent, NW cor. SW NE NE section 13-1n-1w was spudded. Brookside Oil & Gas Co. No. 1 Dodilett, SE SW NE section 21-1n-1w topped the Glen Dean at 1,110 feet and was drilling at 1,240 feet. Sigel & Schlossberg No. 1 Monken, NE SW SW section 4-2n-1w was drilling at 1,435 feet. Holle & Willis No. 1 Hughes and others, C N half NE NW section 18-3n-1w, was drilling at 1,305 feet.

In Effingham County, Kingwood Oil Co. was moving in rotary to start No. 1 McWhorter C E half SE NW section 15-6n-6e.

In Jackson County, Stanolind Oil & Gas Co. No. 1 Leiner, NE NW SW section 20-7s-4w, was drilling at 3,940 feet.

In Fayette County, M. V. Green and others No. 1 Metzger, C N half NE NW section 19-5n-2e, set 10-inch pipe at 20 feet and shut down. Carter Oil Co. No. 1 Dove, C E half NW SE section 15-3n-3e had Benoist sand at

1,480-94 feet, total depth 1,524 feet, but was shut down. Redgraves & Ryan were shut down at 1,815 feet in No. 1 Jones, C S half NE section 24-9-1e. Bad roads are holding back developments in this county.

In Jefferson County, Carter Oil Co. No. 1 Doughett, C W half NE SE section 9-1s-2e, had Benoist sand at 1,947-62 feet and set 6-inch casing at 1,941 feet. The hole filled with water and casing was recemented but would not set and the well was shut down for orders. Sturbois & Tomberlin No. 1 Tessie B. Morse, NW cor. SW section 6-2s-2e was drilling at 2,346 feet.

In Marion County, Mahutska Oil Co. No. 1 Nichols, C E half SW SE section 12-4n-4e, had a small showing of oil at 2,719-23 feet. After a 2,000-gallon acid treatment, the hole was swabbed, bringing up only salt water and a showing of oil. It will be plugged back and re-acidized. Casing was set at 2,688 feet and total depth is 2,885 feet.

In Washington County, Bitterman and others were drilling at 610 feet in No. 1 Jesse, C SW NE section 16-3s-2w.

In Wayne County, Tarpon Petroleum Co. No. 1 Bright had Fredonia top at 2,910 feet and was drilling at 3,022 feet.

In Franklin County, Washburn Petroleum Co. No. 1 Neal, C E half SE SE section 6-5s-4e, was underreaming 7-inch casing at 2,419 feet, total depth 2,490 feet.

In Jefferson County, Nollem & Benoist No. 1 Kelly, NE NW NE section 25-4s-2e, was drilling at 2,565 feet.

In Massac County, Kahle and others No. 1 Harvick, SW SE SW section 23-14s-3e, topped Trenton lime at 2,849 feet and was drilling at 2,867 feet.

In Pope County, C. C. Whitlock and others No. 1 Anthis, SE cor. NE NW NE section 12-11s-5e, was at a total depth of 1,374 feet, in sand, with a small showing of oil.

In Indiana

In Vigo County, Indiana, Carter Oil Co. was drilling at 1,420 feet, in lime, in No. 1 Paddock, C S half NE NE section 16-10n-10w.

In Sullivan County, J. R. Riggs No. 1 Felmont Corp., SW cor. SE NW section 36-8n-9w, penetrated oolitic lime at 1,071-77 feet, total depth, and was delayed fishing for a lost bit. Joe Bernstein No. 1 Riley Dodd, NW cor. SE SW NE section 7-8n-8w, was bailing at 1,905 feet.

In Pike County, Murphy Oil Co. No. 1 Stewart, NW NW NW section 17-1n-9w, was a hole full of water at 1,355-64 feet, broken sand, and was abandoned.

In Daviess County, Ben D. Rupie No. 1 Lydia Brewer heirs in section 33-3n-5w, was drilling at 457 feet.

CENTRAL OHIO

FINDLAY, Ohio, Feb. 28.—Out of the crop of gas wells completed in the Central Ohio fields in the past week only two produced more than 1,000,000 feet per day. One of these was in Lorain and the other in Tuscarawas County.

The completion record follows:

In Athens County, Carthage Township, C. J. Ross No. 1 L. A. Evans, section 32, made 100,000 feet of gas per day from Maxon sand at 1,092 feet.

In Fairfield County, Berne Township, City Natural Gas Co. No. 1 John Shonebarger, section 5, is good for 320,000 feet of gas per day from the Clinton sand at 2,246-79 feet.

In Guernsey County, Jefferson Township, Jewell Oil & Gas Co. No. 1 James McCann, section 7, made 473,000 feet of gas from the Berea at 1,321-23 feet. In Liberty Township, Flannery and others No. 1 J. L. Smith, section 11, made 89,000 feet of gas from the Berea at 1,184-89 feet.

In Knox County, Union Township, Clairmont Oil & Gas Co. No. 1 Robert Rice, section 4, made 450,000 feet of gas from the Clinton at 2,795-2,845 feet.

In Licking County, Mary Ann Township, Hoover Brothers No. 1 Carrie Banks, Lot 23, first quarter, made 150,000 feet of gas from the Berea at 677 feet. In Mary Ann Township, Rutlege & Mosholder No. 2 Mary H. Scott, Lot 19, first quarter, is good for 100,000 feet of gas from the Berea at 694-704 feet. In Perry Township, Armbruster & Stricker No. 2 G. W. Priest, section 7, was dry in the Berea at 546-56 feet.

In Lorain County, Avon Township, William Dempsey No. 1 Casper Weubker, section 28, is good for 1,790,000 feet of gas per day from the Clinton at 2,404 feet.

In Stark County, Jackson Township, East Ohio Gas Co. No. 2 R. V. Mitchell, section 27, started with 170,000 feet of gas per day from Clinton sand at 4,411-31 feet.

In Tuscarawas County, Sandy Township, Fairfield Brick Co. No. 1 Status Development Co., Lot 19, third quarter, is good for 1,300,000 feet of gas per day from Clinton sand at 4,843 feet.

In Washington County, Grandview Township, Hope Construction & Refining Co. No. 1 David L. Reese, section 30, was drilled to a depth of 2,181 feet and abandoned.

Lima Field

In Wood County, Montgomery Township, Myron Jones & Sons No. 1, on a town lot in the village of Bradner, is a 10-bbl. pumper from the Trenton sand. In Jackson Township, George Spohn and others No. 1 Abram Hawkins, section 21, lost tools and are skidding rig to start a new hole.

In Putnam County, Blanchard Township, section 22, G. K. Rogers and others were spudding on the Fred Hector tract.

In Seneca County, Clinton Township, Tiffin Oil Co. No. 2 A. M. Clouse, section 7, is drilling at 2,050 feet. In Liberty Township, Forest Oil Co. No. 1 Homer Martin, section 25, has reached a depth of about 1,000 feet.

EASTERN KENTUCKY OPERATIONS

ASHLAND, Ky., Feb. 28.—Three oil wells and two gas wells were completed in the Eastern Kentucky fields in the past week.

One of the oil wells is a 150-bbl. daily producer and was brought in on the Jesse Frisby land in the Ida May district of Lee County by the Willis Oil Co.

McCown & Wissing completed No. 10, on the Andrew Combs land on Billie's Fork in Lee County, total depth 1,132 feet, and with a production of 25 bbls. per day.

In the same locality, but on Big Sinking, James Garrison and others completed No. 1 at a total depth of 470 feet with a flow of 15 bbls. per day.

The Inland Gas Corp. reports the completion of No. 197 J. C. Hopkins, on Stratton Branch of Levisa Fork in Floyd County, at a total depth of 3,098 feet, in Brown shale. The well has a production of 351,000 feet of gas daily.

The Kentucky-West Virginia Gas Co. completed No. 565, Ingram Stepp land, in Floyd County. This well reached a total depth of 2,490 feet, in shale, and has production of 134,000 feet of gas daily.

Drilling operations, by counties, are as follows:

Pike County

The Inland Gas Corp. drilling at 1,795 feet, in Big lime, in No. 196, Helen Leslie farm, in Pike County.

Floyd County

Kentucky-West Virginia Gas Co. was down 730 feet, in slate, in No. 568 Dillon, on Ivy Creek of Levisa Fork and was drilling at 1,058 feet in salt sand in No. 5233 John F. Burchett on Cow Creek.

Magoffin County

C. J. Sipple & Co. is making little progress in No. 7 William Salyer, on Birch Branch in the Burning Fork district of Magoffin County. With the drill down 600 feet, the operators fear they have a crooked hole.

Lee County

Thomas Witner is down 450 feet in No. 9 P. J. Tipton, on Billie's Fork, Big Sinking district. The South Penn Oil Co. has reached the 800-foot level in No. 97, Flahaven Land Co. land, on Big Sinking.

WESTERN KENTUCKY

OWENSBORO, Ky., Feb. 28.—Four oil wells, two of them good for 75 bbls. per day each, one gas well and five dry holes comprised the list of completions reported in the past week in Western Kentucky.

In Caldwell County, 2 miles east of Farmersville. Hall & Booth No. 1 Tom Franklin was a dry hole and will be abandoned at 1,672 feet.

In Daviess County, Habit district, Rex-Pyramid Oil Co. No. 1 John Christian is a dry hole. In the Utica district, Daugherty & Ellis were moving in to start No. 5 C. W. Howard.

In Grayson County, Falls of Rough district, A. V. Smith and others No. 8 Greene Brothers was good for 40,000 feet of gas from Barlow sand at 437-42 feet, total depth 443 feet, but the hole was abandoned.

In Hancock County, Easton district, William Ralston and others No. 5 Oat Smith was drilling at 275 feet. In the Pellville district, C. D. Walker and others No. 5 Elmer Boling, total depth 430 feet, plugged back to 300 feet, was good for 100,000 feet of gas per day at 298 feet in the stray sand.

In the Goering district, Cumberland Petroleum Co. made a location for No. 1 Clarence Dunleavy. In the Lyonia district, W. W. Damron No. 1 Ben Jackson is a dry hole in Jackson sand at 620-42 feet.

In McLean County, Livermore district, J. C. Miller, trustee, No. 8 Mrs. Fannie Foley is a 75-bbl. well in Bethel sand at 1,075-1,101 feet. No. 9 is rigging up. Jack Cox and others No. 2 D. A. Bennett started at 75 bbls. per day, Bethel sand 1,087-1,111 feet. Shot 80 quarts 1,091-1,111 feet. Kentucky Natural Gas Co. and others No. 2 Richard Shockley was drilling at 100 feet. In the Island district, South-Penn Oil Co. No. 4 H. K. and John Kirtley was dry in the first and second Jett sand and was drilling at 1,565 feet. In the Buel district, J. C. Ellis No. 1 Weil Brothers, deep test, was drilling at 1,505 feet. In the Maxwell district, Ellis & Huff No. 3 John Ditto made an initial production of 50 bbls. from the stray sand at 935-63 feet. It had been shot with 100 quarts at 938-63 feet.

In Ohio County, Fordsville district, Cumberland Petroleum Co. and others No. 1 Joint Line deep test was drilling at 1,250 feet. In the East Livermore district, W. W. Damron and others No. 3 Mary T. Logan was a dry hole through Bethel sand. In the Sunnydale district, Joe Lang and others made a location for No. 4 J. R. Camron. In the Adaburg district, Rex-Pyramid Oil Co. No. 3 P. R. Wells is a 5-bbl. well in stray sand, total depth 622 feet.

In Breckinridge County, Tar Springs district, William Rollins and others No. 1 Acos Brothers, deep test, was drilling at 300 feet. In the Cloverport district, Flesher, Galey and others No. 4 Murray Tile Co., deep test, was drilling at 1,200 feet.

In Muhlenberg County, Paradise district, South-Penn Oil Co. No. 2 Rogers-Crescent Coal Co., deep test, was drilling at 1,200 feet.

New York-Penna. Gas Fields

COUDERSPORT, Pa., Feb. 28.—Two new locations were added to the list of current operations in the New York-Pennsylvania deep sand gas fields during the past week, one each in New York and Pennsylvania.

New York State Natural Gas Co. reported the first, 1,620 feet from the west and 750 feet from the north lines of the Park Estate farm, Woodhull Township, Steuben County. These operators are now digging cellar.

Williamsport Oil & Gas Co. staked the wildcat location on the U. B. Russell farm in Sharon Township, Potter County.

New York Operations

Empire Producing Co. is shut down at 4,736 feet on the Della Mulvey farm, Alma Township, Allegany County, New York. The top of the Onondaga was reached at 4,713 feet.

Belmont Quadrangle Drilling Co. is shut down in the top of the Oriskany sand on the F. Hilligas farm in Willington Township, Allegany County. This test is bottomed at 4,825½ feet, and is gauging 275,000 feet per day. Top of the Oriskany was at 4,822 feet.

New York State Natural Gas Co. is drilling at 805 feet on the Lyle Wheatcraft farm, the only Woodhull, Steuben County, operation now drilling. G. L. Cabot, Inc., has the rig up on the C. Groves farm and is moving in on the Neva Husted farm. Sylvania Corp. has the rig up on the H. Hand No. 2 farm.

In other New York tests, New York State Natural Gas Co. is drilling at 410 feet on the C. D. Carr farm, West Union Township, Steuben County, and is reaming to 1,020 feet on the S. H. English farm, Van Etten Township, Chemung County.

Pennsylvania Operations

New Penn Development Corp. is drilling at 8,145 feet on the Crawford Estate farm in Keating Township, Potter County, a Medina sand test. French and others are drilling at 3,465 feet on the H. O. Perry farm and Ward Wasson is shut down at 5,180 feet on the R. B. Hall farm, both in Genesee Township, this county.

New York State Natural Gas Co. is drilling at 210 feet on the W. A. Simmons farm, Brookfield Township, Tioga County, and McKenry and others are drilling by the tools, lost at 4,429 feet, on the Stellman farm, Rockland Township, Venango County. Evjen and others are shut down at 4,553 feet on the Dusenberry farm in Watson Township, Warren County.

Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ontario, Feb. 26. — Early figures of January crude production from Turner Valley indicate that Davies Petroleum No. 2, LSD 13, in 21-18-2w5, produced 38,386 barrels of oil under proration, with gross revenue of $49,123.04. Commoil No. 1, LSD 15, in 29-18-2w5, produced 29,758 barrels, with a gross value of $37,399.72. In the early part of the month Davies No. 2 was allowed a 3,000-barrel potential, now reduced to 2,313 barrels, while Commoil No. 1 has a potential of 2,998 barrels and is actually the largest individual producer in the field.

In 28-18-24w5, Four Star Petroleum No. 1, LSD 12, after a second acidization, increased its potential from 609 to 1,040 barrels, prorated at 437 barrels per day. Prairie Royalties No. 1, LSD 16, in 17-18-2w5, with a natural production of 1,275 barrels a day, was acidized and increased its potential to 1,490 barrels, but was prorated at 626 barrels per day. Sunset Oils No. 1, LSD 10, in 20-18-2w5, has potential of 1,721 barrels, prorated at 723 barrels. West Flank Oil Co. No. 2, N half LSD 1, in 32-18-2w5, showed a potential of 666 barrels, prorated at 279 barrels. Royal Canadian Oils No. 1, LSD 15, in 20-18-2w5, with a potential of 920 barrels per day after acidizing increased its potential to 964 barrels, prorated at 405 barrels. It will be given a second treatment.

Tests in the Lime

In 20-18-2w5, in the Turner Valley southwest extension, Spy Hill Royalties No. 1, LSD 16, was finished at 7,058 feet, some 455 feet in the limestone. Production was estimated around 400 barrels, through tubing, somewhat less than anticipated. It will be acidized.

In 32-18-2w5, Royalite Oil Co. No. 28, LSD 16, was finished 520 feet in the Madison limestone at 6,949 feet. It was cleared by gas lift and indicated an initial natural production around 600 barrels per day.

In 28-18-2w5, Richland Royalties No. 2, LSD 5, which got the lime at 6,410 feet, is standing at 6,855 feet, with completion held up by subzero weather. Meanwhile some crude production is being taken.

West Side Drilling

In West Central Turner Valley, West Turner Petroleums No. 1, LSD 2, is below 5,700 feet. West Turner No. 2, LSD 7, is below 1,500 feet. West Turner No. 3, LSD 3, has cellar dug. West Flank Oil Co. No. 4, W half LSD 1, has derrick up. West Flank No. 6, W half LSD 8, has cellar dug.

In 29-18-2w5, Davies Petroleums No. 1, LSD 2, is around 6,600 feet after getting the Dalhousie sand, with good shows of gas and crude, at 6,566 feet. It is expected to get the Madison lime around 6,950 feet. Sunburst Oil Co. No. 1, N half LSD 1, is below 6,500 feet, with the Madison lime expected at 6,725 feet.

In 21-18-2w5, Barsac Royalties No. 1, LSD 12, is below 2,833 feet after changing to rotary outfit. Brown Oil Corp. No. 4, LSD 4, is below 6,000 feet, after entering the Home sand at 5,690 feet.

In 20-18-2w5, Consolidated Royalties No. 1, LSD 14, is below 1,000 feet. Inter-City Royalties and others No. 1, LSD 11, is below 490 feet. Sunset Oils No. 2, LSD 7, is rigging.

In 17-18-2w5, Sundance Royalties No. 1, LSD 9, is drilling below 4,270 feet.

In 16-18-2w5, Okalta Oils No. 7, LSD 3, is below 340 feet. Okalta No. 8, LSD 6, is spudding. In 9-18-2w5, National Petroleum Corp. No. 2, LSD 14, is below 5,500 feet. In 33-17-2w5, Davies Petroleums No. 3, LSD 7, is below 958 feet.

To Revive Old Producers

In the old Central Turner Valley field, the G. & B. Co., sponsored by J. W. Gillman and R. L. Belyea, with C. C. Cross as president, will shortly begin work on the old Illinois-Alberta holdings. Illinois-Alberta No. 2, LSD 14, in 12-20-3w5, standing unfinished at 3,681 feet since 1929, will pull back casing and take production from the McDougall-Segur sand. Illinois-Alberta No. 1, same LSD, finished in the Madison lime at 3,862 feet will be acidized and placed on the separator. It formerly had a naphtha production of 107 barrels a day from the lime.

West Fold Drilling

On the Okalta fold, west of the main Turner Valley production, Okalta Oils No. 6, LSD 3, in 30-18-2w5, is drilling below 3,925 feet, after changing to rotary outfit. Scottish Petroleums No. 1, LSD 16, in 19-18-2w5, has resumed from 609 feet after a shutdown due to frozen lines. Mission Oil Co. No. 1, LSD 16, in 31-18-2w5, is working on cellar.

North Turner Valley

In 27-20-3w5, North Turner Valley, Royalite Oil Co. No. 29 Turner Basin, LSD 7, stopped drilling at 6,624 feet, some 349 feet in the Madison limestone, to take a core; but is deepening below 6,630 feet.

East Side Drilling

On the Aldersyde structure, east of Turner Valley, Ranchmen's Oil Co. No. 1, LSD 16, in 13-20-29w4, is fishing at 7,230 feet.

On the Calling Valley structure, Sentinel Oil Co. No. 1, LSD 1, in 8-20-2w5, is shut down at 6,750 feet.

Tests in the Foothills

On the Birch Ridge structure, Elbow Oils No. 1, LSD 11, in 35-22-5w5, is below 5,420 feet and still in the brown sand of the Dalhousie formation. The formation is much thicker than anticipated and very hard with only small shows of gas and crude.

On the Highwood-Sinclair structure, southwest of Turner Valley, Green Valley Oils No. 1 Banner, LSD 6, in 34-17-3w5, is below 5,760 feet and more than 400 feet in the Madison limestone. A crystalline marker at 5,715 feet indicated it was nearing a porous horizon, with possibilities of production around 5,800 feet. Since entering the Fernie shales, the log has shown samples similar to Turner Valley wells, but formations are about one-third thicker.

British Columbia Deep Test

In the Sage Creek-Flathead Valley area of southeastern British Columbia, Columbia Oils No. 1 is down 7,570 feet and preparing to test production. At 7,008 feet the well was thought to be drilling in the Watertown series, the lowest known member of the pre-Cambrian rocks in this area; and it is now believed to have drilled through the pre-Cambrian overthrust into underlying petroliferous formation. Substantial shows of wet gas with some light crude have been found in drilling.

Ontario Operations

In the Brownsville field, Oxford County, Aloka Oil & Gas Co. No. 4 Scanlon, Dereham Township, was finished around 935 feet. It started with 800,000 feet of gas per day. Aloka Oil & Gas Co. No. 9, Watterworth farm, finished in the same

(Continued on Page 113)

"Oil: Stabilization or Conservation?"

A new book offering an intensive study of the basic operating problems of the oil industry has just been published which will be of great interest to petroleum economists and others interested in the oil industry and its functions. The volume, "Oil: Stabilization or Conservation?" was written by Myron W. Watkins, professor of economics at New York University.

It brings to the complex operating problems of one of the country's biggest industries an amount of analytical study, with particular reference to problems of public control, that is rarely available. All phases of the industry as a business are treated; and particular attention is given to the public concern for conservation in relation to the producing methods and distributing policies now prevalent and under consideration.

Growing out of a study of the working of the NRA code in petroleum, this volume brings down to date its consideration of the major problems of the industry with such full knowledge that all executives of the industry and everyone interested in its public regulation will find it an indispensable source book. The book was originally sponsored as a special study of the Brookings Institution in Washington.

The volume contains 270 pages divided into the following chapters: The Economic Significance of Oil; Technical Characteristics and Peculiarities; Design of the Business Structure; Fundamental Factors in Resource Conservation; In Quest of Stability; Further Search for Stability; Administration Mechanism of Stabilization; Allocation of Production Quotas; Interpretation of Production Curtailment; Control of Refinery Operations; Regulation of Marketing Practices; Labor Administration; Pacific Coast Cartel; Business Strategy in Review.

"Oil: Stabilization or Conservation?" may be purchased through the Book Department of The Oil and Gas Journal at the regular retail price of $3.50, express prepaid (postage extra outside the United States), and a copy will be forwarded promptly upon receipt of check or money order. Where no payment is received, the book will be sent express c.o.d to avoid delay.

Drilling Contractors

(Continued from Page 87)

Cron & Gracey received contract from the Red Bank Oil Co. for an interesting outpost test to be drilled about a mile from production at the Hitchcock field in Galveston County. In the meantime other operations are reported in the Lake Long, Gibson, and Tomball fields for Fohs Oil Co., Shell Petroleum Corp. and Amerada Petroleum Corp.

Harry L. Edwards has completed his No. 1 Robertson, an east offset to the discovery well of the East Telferner field, Victoria County. It is cleaning into pits, making gas and a small quantity of oil. Completion was made by perforating the casing at 5,118-22 feet. Three other active rigs are located at Hardin, Dickinson and Lockridge fields.

There was no increase in the number of new locations reported for the Texas Coast the past week. There were 32 locations and 14 completions reported. Practically all work was in proven fields, with Hastings, Friendswood, Heyser and Tomball fields leading in the activity.

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WILDCAT OPERATIONS

CALIFORNIA

IMPORTANT WELLS AND NORTHERN CALIFORNIA WILDCATS

Company, well, location, and county—	S.T.R.	Depth	Status
Wilshire Oil, No. 1 Gaviota, Santa Barbara	35- 5-33	2,096	sd. sh. drlg.
Hancock-Bush, No. 2-W Santa Maria, Santa Barbara	30-10-33	4,598	sd. sh. drlg.
Hancock-Bush, No. 2-R Santa Maria, Santa Barbara	25-10-34	4,438	flow. 3,250 b.d.
Anderson, J., No. 1 A.&T., Santa Maria, Santa Barbara	28-10-34	5,270	sd. sh. drlg.
Cal. Lands, Inc., No. 3 Santa Maria, Santa Barbara	26-10-34	4,521	sd. sh. drlg.
Moore, E. H., No. 13-E Sugar, S. Maria, Santa Barbara	24-10-35	5,527	P.B. 5,232
Signal Oil, No. 2 Romalho, S. Maria, Santa Barbara	27-10-34	4,580	cmtd. 4,343
Signal Oil, No. 3 Romalho, S. Maria, Santa Barbara	27-10-34	2,167	sd. sh. drlg.
Union Oil, No. 2-V Santa Maria, Santa Barbara	21-10-34	4,250	sd. sh. drlg.
Union Oil, No. 2-O Santa Maria, Santa Barbara	20-10-34	3,590	sd. sh. drlg.
Union Oil, No. 1 Wheat, Santa Maria, Santa Barbara	22-10-34	4-181	pump. 420 b.d.
Union Oil, No. 20 Squires, Orcutt, Santa Barbara	27- 9-34	4,300	O.S. drlg.
Pet. Equities, No. 1 Webber, S. Maria, Santa Barbara	27-10-34	3,050	sd. sh. drlg.
Wilson Oil, No. 1-B Santa Maria, Santa Barbara	26-10-34	1,982	sd. sh. drlg.
York Oil, No. 2 Doane, Santa Maria, Santa Barbara	27-10-34	2,448	fish. D.P.
Jones, F. E., No. 1-W, Santa Maria, Santa Barbara	27-10-34	4,600	sd. sh. drlg.
Pac. West. Oil, No. 11-H Santa Maria, Santa Barbara	21-10-34	4,097	sd. sh. drlg.
Pima Drlg., No. 1 Morganti, Casmalia, Santa Barbara	13- 9-35	1,800	bailing
Standard Oil, No. 1 Cat Canyon, Santa Barbara	27- 9-33	5,020	hd. sh. drlg.
Bell, A. E., No. 4 York, Lompoc, Santa Barbara	33- 8-34	3,104	sd. sh. drlg.
Moyle Pet., No. 1 Gato Ridge, Santa Barbara	9- 8-32	3,270	redrlg. 3,220
Carpinteria Oil, No. 1 Carpinteria, Santa Barbara	32- 4-25	902	sd. sh. drlg.
Fisher, D., No. 1 Cuyama, Santa Barbara	28-11-28	1,255	hd. sh. drlg.
Rowe, W. G., No. 1 Johnson, Oxnard, Ventura	15- 1-22	3,575	hd. sh. drlg.
High Mesa Oil, No. 1 Butcher, Ojai, Ventura	16- 4-22	1,325	hd. sd. drlg.
Texas Co., No. 5 Yale, South Mountain, Ventura	13- 3-21	2,690	sd. sh. drlg.
Texas Co., No. 1 Edwards, Camarillo, Ventura	19- 2-21	6,111	fish. D.P.
Stalling & Senter, No. 1 Timber Canyon, Ventura	24- 4-21	680	O.S. drlg.
Arnett, F. E., No. 3 Santa Paula, Ventura	15- 4-21	1,401	idle
Section 20 Oil, No. 1 Sespe, Ventura	20- 5-19	1,607	reaming
Condor Oil, No. 1 Dorman, Sespe, Ventura	6- 4-19	2,193	cleaning out
Skyline Oil, No. 1-H Hopper Canyon, Ventura	13- 4-19	2,747	pump. 90 b.d.
C. C. M. Oil, No. 11 Rincon, Ventura	17- 3-24	3,760	flow. 280 b.d.
C. C. M. Oil, No. 19 Rincon, Ventura	17- 3-24	1,977	redrlg. 850
C. C. M. Oil, No. 20 Rincon, Ventura	8- 3-24	3,877	sd. sh. drlg.
Richfield Oil, No. 1 State, Rincon, Ventura	17- 3-24	2,580	cleaning out
General Pet., No. 3 Ferguson, Rincon, Ventura	6- 3-24	2,610	idle
Tide Water A. O., No. 19 V.L.W., Ventura, Ventura	26- 3-23	6,381	sd. sh. drlg.
Tide Water A. O., No. 41 V.L.W., Ventura, Ventura	24- 3-23	6,755	sd. sh. drlg.
Tide Water A. O., No. 69 Lloyd, Ventura, Ventura	27- 3-23	6,352	recmtd. 6,135
Tide Water A. O., No. 79 Lloyd, Ventura, Ventura	27- 3-23	4,990	recmtd. 4,869
Tide Water A. O., No. 135 Lloyd, Ventura, Ventura	27- 3-23	9,520	cmtd. 9,514
Tide Water A. O., No. 138 Lloyd, Ventura, Ventura	23- 3-23	8,660	hd. sh. drlg.
Tide Water A. O., No. 18 Hartman, Ventura, Ventura	2- 3-23	10,090	completing
Shell Oil, No. 93 Taylor, Ventura Ave., Ventura	30- 3-23	7,250	O.S. drlg.
General Pet., No. 13 Notten, Ventura Ave., Ventura	28- 3-23	9,871	cleaning out
Amerada Pet., No. 5 Beer, Devils Den, Kern	22-26-19	6,803	fish. D.P.
Rocima Oil, No. 1 Laymance, McKittrick, Kern	20-30-22	3,122	P.B. 1,427
Par-Mer Oil, No. 1 McKittrick, Kern	6-31-30	2,064	idle
Standard Oil, No. 2 Randolph, Semi-Tropic, Kern	14-27-23	9,357	P.B. 7,615
Continental Oil, No. 2 KCL, Wasco, Kern	8-27-24	13,652	sd. sh. drlg.
Chico-Martinez Oil, No. 1 South Belridge, Kern	1-29-20	1,066	P.B. 1,029
Taylor, W., No. 1 FKL, South Belridge, Kern	12-29-21	1,259	dry; abd.
Texas Co., No. 2-23 Theta, Lost Hills, Kern	2-26-20	1,255	P.B. 1,234
Argo Pet., No. 1 Farnsworth, Lost Hills, Kern	11-26-20	1,279	O.S. drlg.
Belridge Oil, No. 27-6 North Belridge, Kern	27-27-20	2,161	sd. sh. drlg.
Belridge Oil, No. 27-7 North Belridge, Kern	27-27-20	7,990	br. sh. drlg.
Belridge Oil, No. 27-8 North Belridge, Kern	27-27-20	8,455	O.S. drlg.
Tide Water A. O., No. 7 Reward, North Belridge, Kern	34-27-20	8,250	br. sh. drlg.
Tide Water A. O., No. 1-21 North Belridge, Kern	21-27-20	8,200	hd. sd. drlg.
Tide Water A. O., No. 2-21 North Belridge, Kern	21-27-20	8,211	hd. sd. drlg.
Richfield Oil, No. 1-A North Belridge, Kern	22-27-20	7,380	br. sh. drlg.
Texas Co., No. 2 Martin, North Belridge, Kern	22-27-20	8,480	O.S. drlg.
Texas Co., No. 3 Martin, North Belridge, Kern	22-27-20	5,750	br. sh. drlg.
General Pet., No. 1 St. Helens, Belridge, Kern	12-28-20	7,697	br. sh. drlg.
Johnson, G. W., No. 1 Brown, Temblor, Kern	33-29-20	1,015	idle
Richfield Oil, No. 1 Olcese, Round Mountain, Kern	17-28-29	1,720	sd. sh. drlg.
Coast Expl., No. 1 Coffee, Round Mountain, Kern	6-28-29	1,915	fishing
Vedder Pet., No. 2 Bell, Round Mountain, Kern	12-28-28	1,926	O.S. drlg.
California Star Oil, No. 6-80 Kern Front, Kern	22-28-27	1,720	sd. sh. drlg.
Rubenstein, A. B., No. 1 Lerdo, Kern	20-28-27	3,352	swabbing
Dickey, H. B., No. 1 Kern River, Kern	34-28-28	290	sd. sh. drlg.
Pottenger, F. M., No. 1 Orcier, Mount Poso, Kern	34-25-28	1,098	sd. sh. drlg.
Carter, J. P., No. 2 S.P.L., Mount Poso, Kern	3-27-28	1,473	fish D.P.
Bargol Oil, No. 2 Claffiin, Mount Poso, Kern	10-27-27	1,281	sd. sh. drlg.
Ring Oil, No. 6 Bowles, Mount Poso, Kern	29-26-28	994	sd. sh. drlg.
Ring Oil, No. 1 KCL, Mount Poso, Kern	16-26-28	1,355	gr. sd.; abd.
Western Gulf Oil, No. 33 KCL, Fruitvale, Kern	22-29-27	3,439	O.S. drlg.
Cal-West. Oil, No. 1 KCL, Fruitvale, Kern	14-29-27	3,511	pump. 110 b.d.
Wood Callahan Oil, No. 21-2 Edison, Kern	21-30-29	3,675	P.B. 3,150
Petrex, Inc., No. 1 Arvin, Kern	32-31-30	3,461	sd. sh. drlg.
Union Oil, No. 1 Berry, Arvin, Kern	15-31-29	2,991	sd. sh. drlg.
Superior Oil, No. 1 Wagner, Rio Bravo, Kern	35-28-25	10,810	br. sh. drlg.
Superior Oil, No. 2 Wagner, Rio Bravo, Kern	35-28-25	7,790	sd. sh. drlg.
Superior Oil, No. 1 Geissinger, Rio Bravo, Kern	32-28-25	9,981	sd. sh. drlg.
Superior Oil, No. 1 Ruhl, Rio Bravo, Kern	1-29-25	9,190	sd. sh. drlg.
Union Oil, No. 2-34 KCL, Rio Bravo, Kern	34-28-25	10,286	br. sh. drlg.
Getty Oil, No. 1 Ramsey, Rio Bravo, Kern	35-28-25	6,895	sd. sh. drlg.
General Pet., No. 1 Wagoner, Rio Bravo, Kern	35-28-25	6,780	sd. sh. drlg.
Shell Oil, No. 58-A KCL, Bellevue, Kern	29-29-27	5,182	sd. sh. drlg.
Continental Oil, No. 1-D KCL, Greeley, Kern	10-30-36	6,895	sd. sh. drlg.
Superior Oil, No. 9 KCL, Greeley, Kern	3-30-26	7,870	redrlg. 6,640
Standard Oil, No. 1 Calder Klassen, Greelev, Kern	20-29-26	7,781	O.S. drlg.
Standard Oil, No. 2 Fleishauer, Greeley, Kern	20-29-26	7,460	sd. sh. drlg.
Standard Oil, No. 11-2 KCL, Greeley, Kern	20-29-26	10,040	fish. D.P.
Standard Oil, No. 11-12 KCL, Greeley, Kern	20-29-26	7,902	redrlg. 6,980
Standard Oil, No. 11-13 KCL, Greeley, Kern	20-29-26	6,180	sd. sh. drlg.
Standard Oil, No. 12-4 KCL, Greeley, Kern	16-29-26	7,635	gr. sh. drlg.
Shell Oil, No. 8-29-A KCL, Ten Section, Kern	29-30-26	7,561	sd. sh. drlg.
Shell Oil, No. 41-32-B KCL, Ten Section, Kern	32-30-26	7,801	sd. sh. drlg.
Shell Oil, No. 52-31-B KCL, Ten Section, Kern	31-30-26	8,220	P.B. 8,131
Shell Oil, No. 81-31-B KCL, Ten Section, Kern	31-30-26	4,991	sd. sh. drlg.
Shell Oil, No. 72-14-A KCL, Canal, Kern	14-30-25	8,171	cmtd. 8,108
Ohio Oil, No. 5-E KCL, Canal, Kern	14-30-25	914	sd. sh. drlg.
Ohio Oil, No. 8-A KCL, Buena Vista Lake, Kern	32-31-26	8,050	sd. sh. drlg.
Merritt-Annex Oil, No. 7 Midway-Sunset, Kern	25-12-24	3,420	cleaning out
Richfield Oil, No. 1 M.C. Midway-Sunset, Kern	24-31-22	2,560	bailing
C. C. M. Oil, No. 4 Tumbador, Midway-Sunset, Kern	24-31-22	1,093	sd. sh. drlg.
C. C. M. Oil, No. 76 M.S., Midway-Sunset, Kern	6-32-23	1,315	pump. 15 b.d.
Berry Oil, No. 22 Midway-Sunset, Kern	28-12-24	615	sd. sh. drlg.
Chemeketa Oil, No. 1 Midway-Sunset, Kern	15-32-23	2,355	cleaning out
Standard Oil, No. 35-23-D Midway-Sunset, Kern	23-32-24	3,620	sd. sh. drlg.
Victor Oil, No. 14 Midway-Sunset, Kern	35-32-23	2,735	br. sh. drlg.
Fromax Oil, No. 22 Midway-Sunset, Kern	36-32-23	1,790	br. sh. drlg.
National Oil, No. 17 Midway-Sunset, Kern	35-32-23	1,315	sd. sh. drlg.
Texas Co., No. 1 Pioneer, Midway-Sunset, Kern	33-11-23	7,050	gr. sd. drlg.
Texas Co., No. 30 Midway-Sunset, Kern	32-32-24	3,245	fish. bailer
Standard Oil, No. 2-14-A Tupman, Elk Hills, Kern	36-30-24	2,995	pump. 75 b.d.
Petrol Corp., No. 1 Tejon, Kern	32-11-19	6,004	br. sh. drlg.
Honolulu Oil, No. 33-1 SP, Tejon, Kern	33-12-19	8,030	dry; abd.
Universal Consd., No. 1 Tejon, Kern	33-11-19	4,988	P.B. 4,634
Shell Oil, No. 4-26 KCL, San Emidio, Kern	26-11-22	7,670	fish. D.P.
Pure Oil, No. 1 SPL, Cantua, Fresno	31-18-18	10,475	br. sh. drlg.
Superior Oil, No. C.U.P., Fresno	20-16-13	4,561	sd. sh. drlg.
Central Valley Oil, No. 1 Dry Creek, Fresno	1-12-20	537	sd. sh. drlg.
Jacalitos Oil, No. 1 Jacalitos, Fresno	14-21-15	5,870	redrlg. 5,196
Pet. Sec., No. 2 Gatchell, Jacalitos, Fresno	18-20-16	5,874	gr. sh. drlg.
K. N. D. A., No. 4-18-J Kettleman North, Fresno	18-21-17	10,810	flow. 1,050 b.d
K. N. D. A., No. 67-20-J Kettleman North, Fresno	20-21-17	9,496	hd. sh. drlg.
K. N. D. A., No. 72-4-P Kettleman North, Fresno	4-22-17	7,587	br. sh. drlg.
K. N. D. A., No. 6-6-Q Kettleman North, Kings	6-22-18	8,690	P.B. 8,189
K. N. D. A., No. 6-8-Q Kettleman North, Kings	8-22-18	5,965	br. sh. drlg.
K. N. D. A., No. 38-8-Q Kettleman North, Kings	8-22-18	4,630	sd. sh. drlg.
K. N. D. A., No. 47-18-Q Kettleman North, Kings	16-22-18	5,791	hd. sh. drlg.
Standard Oil, No. 27-21-J Kettleman North, Fresno	21-21-17	10,196	br. sh. drlg.
Standard Oil, No. 58-33-J Kettleman North, Fresno	33-21-17	5,755	sd. sh. drlg.
Standard Oil, No. 2-11-P Kettleman North, Kings	11-22-17	7,850	cleaning out

KEY TO ABBREVIATIONS USED IN DRILLING REPORTS

Abd., abandoned.
Acd., acidized.
B.O., barrels of oil.
B.P.D., barrels per day.
B.D., barrels daily.
B.P., back pressure.
B.R., building rig.
Br. sh., brown shale.
B.S., basic sediment.
Cd. or Crd., cored.
C.D., corrected depth.
Cg., coring.
Cmtd., cemented.
C.O., cleaning out.
Comp., completed.
Compr., compressor.
C.P., casing pressure, also cement through perforations.
Csg., casing.
D.D., drilling (or drilled) deeper.
Drlg. or Drg., drilling.
Drk. or Dk., derrick.
D.S., drill stem.
D.&A., dry and abandoned.
Fsg., fishing.
Gbo., gumbo.
G.I., gas injection.
Gr., gravity.
Gr. sd., gray sand.
Grn. sh., green shale.
Hd. sd., hard sand.
H.F.W., hole full of water.
I.P., initial production.
L., lime.
L.D.D., later drilled deeper.
Lnr., liner.
Loc., location.
M.I.M., moving in material.
M.I.R., moving in rig.
M.I.R.T., moving in rotary tools.
M.O.T., milling on tools.
O.I.H., oil in hole.
O.S., oil sand.
O.T.D., old total depth.
O.W.D.D., old well drilling deeper.
O.W.P.B., old well plugging back.
P.B., plugging or plugged back.
P.B.P., pulling or pulled big pipe.
P.L., pipe line.
P.L.O., pipe line oil.
Pmpg., pumping.
P.O.P., putting on pump.
P.P., pulled pipe.
Rd. sd., red sand.
Rd. sh., red shale.
Recmt., recemented.
Rmg., reaming.
Redrlg., redrilling.
Rng., running.
R.O.G., rig on ground.
R.P., rock pressure.
R.U., rigging up.
R.U.R., rigging up rotary.
R.U.S.T., rigging up standard tools.
R.&T., rods and tubing.
S. or Sd., sand.
S.D., shut down.
Sdy. sh., sandy shale.
Sdtr., or St. sidetracking.
S.D.P.L., shut down for pipe line.
S.D.O., or S.D.W.O., shut down awaiting orders.
S.G., show gas.
Sh.&L., shale and lime.
S.I., shut in.
S.I.P., shut in, prorated.
S.L.M., steel line measurement.
S.O., show oil.
S.O.G.&W., show of oil, gas and water.
Spdg. or Spd., spudding.
S.R., straightreaming.
Stdg., standardizing (also standing).
S.W., salt water.
Swbg., swabbing.
T.A., temporarily abandoned.
Tbg., tubing.
T.D., total depth.
T.P., tubing pressure.
Tr., tract.
U.R., underreaming.
W.I.H., water in hole.
W.O., workover.
W.O.C. or W.O.C.S., waiting for cement to set.
W.P., working pressure.
W.S.O., water shutoff.
W.S.S.O.K., water shutoff O.K.
W.S.O.N.G., water shutoff no good.
W.S.R. or W.O.S.R., awaiting standard rig.
Wtr., water.

Standard Oil, No. 87-1-P Kettleman North, Kings	1-22-17	5,293	sd. sh. drlg.
Standard Oil, No. 21-13-P Kettleman North, Kings	13-22-17	7,284	br. sh. drlg.
Standard Oil, No. 41-7-Q Kettleman North, Kings	7-22-18	6,860	br. sh. drlg.
Standard Oil, No. 85-7-Q Kettleman North, Kings	7-22-18	2,350	sd. sh. drlg.
Superior Oil, No. 5 Huffman, Kettleman No., Fresno	29-21-17	10,746	flow. 520 b.d.
Bandini Pet., No. 5 Whepley, Kettleman No., Fresno	35-21-17	9,400	sd. sh. drlg.
Pyramid Prod., No. 1 Kettleman Plains, Kings	27-24-18	2,297	gr. sd. drlg.
Standard Oil, No. 2 Weyl, McDonald Is., San Joaquin	25- 2-4	8,350	br. sh. drlg.
Wilshire Oil, No. 1 Cowell, Half Moon Bay, San Mateo	20- 6-5	7,730	sd. sh. drlg.

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well, location, and county—	S.T.R.	Depth	Status
Apex Pet., No. 1-C El Segundo, Los Angeles	12- 3-15	7,408	sd. sh. drlg.
Sovereign Oil, No. 1 El Segundo, Los Angeles	12- 3-15	6,896	sd. sh. drlg.
Termo Co., No. 2 El Segundo, Los Angeles	12- 3-15	7,400	sd. sh. drlg.
Ohio Oil, No. 11 Gough, El Segundo, Los Angeles	7- 3-14	7,373	O.S. drlg.
Standard Oil, No. 8 Refinery, El Segundo, Los Angeles	13- 3-15	7,261	sd. sh. drlg.
Wilshire Oil, No. 1 Const., El Segundo, Los Angeles	12- 3-15	7,400	O.S. drlg.
Standard Oil, No. 84 LAI Inglewood, Los Angeles	17- 2-14	3,615	pump. 260 b.d
Phalen & Pietzschke, No. 1 Torrance, Inglewood, L. A.	14- 4-14	3,790	redrlg. 3,694
Pollock & O'Niel, No. 21 Torrance, Los Angeles	14- 4-14	3,800	redrlg. 3,670
McCaslin, W. E., No. 2 Torrance, Los Angeles	14- 4-14	3,805	redrlg. 3,746
Anderson, N. H., No. 2 Torrance, Los Angeles	14- 4-14	5,006	O.S. drlg.
Anderson, N. H., No. 4 Torrance, Los Angeles	23- 4-14	5,051	sd. sh. drlg.
Emerald Oil, No. 1 fee, Torrance, Los Angeles	23- 4-14	5,120	pump water.
Camp, C. W., No. 1 Perkins, Torrance, Los Angeles	23- 4-14	4,885	sd. sh. drlg.
Doyle Pet. Co., No. 1 Bond, Torrance, Los Angeles	14- 4-14	3,594	sd. sh. drlg.
Doyle Pet. Co., No. 1 Neill, Torrance, Los Angeles	14- 4-14	3,142	sd. sh. drlg.
Elyod Oil, No. 1 Post, Torrance, Los Angeles	14- 4-14	3,774	cleaning out
Woolner Oil, No. 5 Torrance, Los Angeles	14- 4-14	5,020	sd. sh. drlg.
Texas Co., No. 5 Redondo, Torrance, Los Angeles	5- 4-14	3,442	cleaning out
Texas Co., No. 3 Wilson, Torrance, Los Angeles	15- 4-14	3,759	cleaning out
M. & M. Oil, No. 6-L Torrance, Los Angeles	22- 4-14	5,130	sd. sh. drlg.
Superior Oil, No. 5 Torrance, Los Angeles	16- 5-14	3,730	redrlg. 3,710
Lakeside Oil, No. 1 Cook, Torrance, Los Angeles	16- 4-14	3,760	will deepen
Coast Line Oil, No. 1 Torrance, Los Angeles	16- 4-14	3,775	P.B. 2,520
C. C. M. Oil, No. 14 Torrance, Los Angeles	16- 4-14	4,015	deepening
Fisher, N., No. 1 Watkins, Torrance, Los Angeles	23- 4-14	5,150	sd. sh. drlg.
Fisher, N., No. 1 Washburn, Torrance, Los Angeles	16- 4-14	5,175	sd. sh. drlg.
Berken Oil, No. 1 Star, Torrance, Los Angeles	16- 4-14	3,758	will deepen
Union Oil, No. 49 Hellman, Dominguez, Los Angeles	33- 3-13	6,724	sd. sh. drlg.
Union Oil, No. 58 Callender, Dominguez, Los Angeles	33- 3-13	5,200	sd. sh. drlg.
Union Oil, No. 59 Callender, Dominguez, Los Angeles	33- 3-13	4,491	cmtd. 3,947
Union Oil, No. 60 Callender, Dominguez, Los Angeles	33- 3-13	2,141	sd. sh. drlg.
Barnsdall Oil, No. 20 O'Dea, Rosecrans, Los Angeles	18- 3-13	2,992	sd. sh. drlg.
Union Oil, No. 18-R Rosecrans, Los Angeles	18- 3-13	7,190	sd. sh. drlg.
Universal Consd., No. 2 Trust, Rosecrans, Los Angeles	18- 3-13	4,583	sd. sh. drlg.
Texas Co., No. 5-1 Gardena, Los Angeles	30- 3-13	7,885	dry; abd.
Towsley Canyon Oil, No. 1 Newhall, Los Angeles	8- 3-16	4,105	cleaning out
Royal Lands, No. 1 Ramona, Castaic, Los Angeles	8- 4-17	366	fish. bit
General Pet., No. 2 Blinn, Wilmington, Los Angeles	35- 5-13	3,270	sd. sh. drlg.
General Pet., No. 34 Ford, Wilmington, Los Angeles	4- 5-13	4,075	O.S. drlg.
General Pet., No. 37 Ford, Wilmington, Los Angeles	4- 5-13	4,100	O.S. drlg.
General Pet., No. 3-5 C.C., Wilmington, Los Angeles	2- 5-13	3,000	O.S. drlg.
General Pet., No. 1 Harbor, Wilmington, Los Angeles	3- 5-13	3,939	flow. 550 b.d.
General Pet., No. 5 Harbor, Wilmington, Los Angeles	2- 5-13	2,680	sd. sh. drlg.
General Pet., No. 7 Harbor, Wilmington, Los Angeles	2- 5-13	3,900	flow. 2,750 b.d.
Allied Pet., No. 24 Wilmington, Los Angeles	32- 4-13	3,007	flow. 270 b.d.
Bankline Oil, No. 3-U.P., Wilmington, Los Angeles	3- 5-13	2,413	sd. sh. drlg.
Bankline Oil, No. 4-U.P., Wilmington, Los Angeles	3- 5-13	3,892	flow. 7,042
Bankline Oil, No. 5-U.P., Wilmington, Los Angeles	2- 5-13	3,650	O.S. drlg.
Baker Oil, No. 1 Wilmington, Los Angeles	35- 4-13	3,078	cmtd. 3,077
Caminol Co., No. 2-7-H Wilmington, Los Angeles	2- 5-13	1,068	sd. sh. drlg.
Hancock Oil, No. 2-A Wilmington, Los Angeles	2- 5-13	4,014	O.S. drlg.
Hancock Oil, No. 6-E Wilmington, Los Angeles	2- 5-13	2,651	sd. sh. drlg.
L. B. Harbor Oil, No. 2-CC, Wilmington, Los Angeles	2- 5-13	2,470	sd. sh. drlg.
Macson Oil, No. 2-C Wilmington, Los Angeles	32- 4-13	3,638	pump. 151 b.d.
Pongratz, Gus, No. 2-A Wilmington, Los Angeles	32- 4-13	2,983	sd. sh. drlg.
Pongratz, Gus, No. 2-G Wilmington, Los Angeles	32- 4-13	2,987	sd. sh. drlg.
Richfield Oil, No. 1-G Wilmington, Los Angeles	2- 5-13	5,260	sd. sh. drlg.
Richfield Oil, No. 2-R.O., Wilmington, Los Angeles	2- 5-13	2,281	sd. sh. drlg.
Richfield Oil, No. 4-P.G., Wilmington, Los Angeles	2- 5-13	1,994	sd. sh. drlg.
Superior Oil, No. 14 B.B., Wilmington, Los Angeles	4- 5-13	3,018	flow. 315 b.d.
Texas Co., No. 2 Ref., Wilmington, Los Angeles	32- 4-13	3,472	sd. sh. drlg.
Union Pacific, No. 48 Wilmington, Los Angeles	33- 4-13	2,625	cmtd. 2,608
Union Pacific, No. 49 Wilmington, Los Angeles	34- 4-13	3,982	O.S. drlg.
Union Pacific, No. 51 Wilmington, Los Angeles	34- 4-13	2,767	sd. sh. drlg.
Union Pacific, No. 70 Wilmington, Los Angeles	34- 4-13	2,630	O.S. drlg.
Union Pacific, No. 71 Wilmington, Los Angeles	34- 4-13	2,683	sd. sh. drlg.
Union Pacific, No. 72 Wilmington, Los Angeles	34- 4-13	2,650	sd. sh. drlg.
Universal Consd., No. 2 Newport, Wilmington, L. A.	2- 5-13	2,097	sd. sh. drlg.
W. G. Oil, No. 1-A LBHD, Wilmington, Los Angeles	3- 5-13	2,190	sd. sh. drlg.
W. G. Oil, No. 2-A LBHD, Wilmington, Los Angeles	3- 5-13	1,984	fish. D.P.
W. G. Oil, No. 3-A LBHD, Wilmington, Los Angeles	3- 5-13	2,350	sd. sh. drlg.
W. G. Oil, No. 4-A LBHD, Wilmington, Los Angeles	3- 5-13	2,354	sd. sh. drlg.
Johnston Drlg., No. 1 Montebello, Los Angeles	5- 2-11	2,860	sd. sh. drlg.
St. Helens Pet., No. 24-M Montebello, Los Angeles	2- 2-12	4,190	sd. sh. drlg.
Hilldon Oil, No. 2 North Long Beach, Los Angeles	13- 4-13	3,380	sd. sh. drlg.
Abrams, John, No. 1 Flood Control, Los Angeles	13- 4-13	4,230	will deepen
Kramildon Oil, No. 1 Long Beach, Los Angeles	13- 4-13	3,570	sd. sh. drlg.
Powers, E. D., No. 3 Long Beach, Los Angeles	20- 4-12	4,303	sd. sh. drlg.
Sunset Oil, No. 1 Whitney, Long Beach, Los Angeles	19- 4-12	3,095	sd. sh. drlg.
Shell Oil, No. 15-C Long Beach, Los Angeles	19- 4-12	3,200	sd. sh. drlg.
Richfield Oil, No. 4-B, Long Beach, Los Angeles	13- 4-13	3,780	sd. sh. drlg.
Ramsey, W. E., No. 1 Monterey Park, Los Angeles	27- 1-12	4,240	sd. sh. drlg.
Union Oil, No. 100 Santa Fe Springs, Los Angeles	6- 3-11	11,314	P.B. 11,155
Continental Oil, No. 40 Bixby, Seal Beach, Orange	2- 5-12	7,501	P.B. 6,570
W. P. R. Oil, No. 3 Huntington, Orange	35- 5-11	6,935	cmtd. 6,935
Lido Pet., No. 1 Severns, Huntington, Orange	34- 4-11	3,801	pulled pipe
Brea Canyon Oil, No. 48 Brea Canyon, Orange	2- 3-10	1,181	hd. sd. drlg.
Standard Oil, No. 127 Murphy, West Coyote, Orange	18- 3-10	3,240	cmtd. 3,224
Union Oil, No. 29 Chapman, Richfield, Orange	29- 3-9	10,496	P.B. 4,610
Standard Oil, No. 2-26 Kraemer, Richfield, Orange	32- 3-9	4,190	sd. sh. drlg.
Oil Income, No. 1 Anderson, Yorba, Orange	22- 3-9	2,182	P.B. 1,779
Fairfield, F. E., No. 1 Dutton, Yorba, Orange	22- 3-9	1,662	bailing
Perl, J., Oil, No. 1-D Yorba, Orange	21- 3-9	1,118	sd. sh. drlg.
Oliver & Owen, No. 1 Anderson, Yorba, Orange	22- 3-9	972	sd. sh. drlg.
Beth Pet., No. 1 Pickering, Yorba, Orange	21- 3-9	2,311	O.S. drlg.
Selegna Oil, No. 1-A Chino, San Bernardino	12- 3-8	3,159	gr. sd. drlg.

KANSAS

Week Ending February 26 (Descriptions are East unless marked otherwise)

Barber County

Carter Oil Co. et al No. 1 Ely, C NE NW sec. 6-32-14w. Drlg. 3,325 ft.
Palmer Oil Corp. et al No. 1 Warwick, C NW sec. 29-31-10w. S.D. 4,000 ft.

Barton County

Crown Oil Co. No. 1 Schwartz, NW sec. 7-20-11w. Drlg. 1,100 ft.
R. E. Day et al No. 1 Feitz, SE SE NE sec. 14-16-12w. S.D. 1,875 ft.
Martin & Foraker et al No. 1 Dick Est., NE SW SW sec. 31-19-11w. Rig.
C. L. Price No. 1 Hammeke, NE NE SW sec. 12-18-12w. Sil. 3,415-27 ft.; T.D. 3,433 ft.; P.B. 3,429 ft.; est. 20 B.O. P.D. and 2 B.W.
Sinclair Prairie Oil Co. No. 1 Frederick, SW SW SE sec. 16-16-11w. Drlg. 1,808 ft.
Sinclair Prairie Oil Co. No. 1 Oser, NE SE sec. 17-16-11w. T.D. 3,278 ft.; D.&A.
Texas Co. No. 1 Lowry, CNL NW SW sec. 2-17-13w. Drlg. 3,353 ft.

Butler County

T. S. Dustin No. 1 Miley, SE NW NE sec. 17-27-5e. S.D. 810 ft.
Saco Oil Co. et al No. 1 Pettit, SW NW SW sec. 21-28-6. S.D. 275 ft.
Steinbuchel et al No. 1 Fox, NW SE NE sec. 25-26-3e. S.D. 1,010 ft.

Chase County

T. D. Duffy No. 1 Leedy, NE NW NW sec. 26-22-9. Drlg. 1,470 ft.

Clark County

Olson Oil Co. No. 1 Lenman, SE SW sec. 20-32-31w. Arb. 6,735 ft.; T.D. 6,807 ft.; D.&A.
Olson Oil Co. et al No. 1 Watkins, SW NW sec. 23-32-21w. P.B. 6,810 ft.; drlg. cmt.

Cowley County

Arthur Brewer No. 1 Clark, NE SE NW sec. 6-31-4. Bvlle. 2,860-70 ft.; 600 ft. O.I.H. in 3 hrs.; set 5-in. csg at 2,860 ft.; W.O.C.
Tom Palmer No. 1 Neimaller, NE cor. sec. 14-30-4e. Drlg. 2,400 ft.
Trees Oil Co. and Talbott No. 1 McMinn NE NW sec. 16-31-6. Miss. L. 2,903 ft.; T.D. 2,995 ft.; D.&A.
Earl Wakefield No. 1 White, NW NE sec. 4-33-4e. S.D. 1,500 ft.

Ellis County

Central Pet. Co. No. 1 Foster, CSL SE NW sec. 33-11-16w. Drlg. 3,042 ft.
Colonial Oil Co., Trott et al No. 1 Hadley, SE NE SE sec. 12-11-8w. T.D. 3,146 ft.; drlg. cmt.
Hays & Sackrider No. 1 Windholtz, NE cor. sec. 2-13-16w. T.D. 3,162 ft.; 700 ft. O.I.H.
J. J. Muth et al No. 1 Penney, C N½ NE SE sec. 29-14-18w. T.D. 350 ft.; abd.

Ellsworth County

Colonial Oil Co. No. 1 Hogy, NW cor. sec 16-16-10w. T.D. 3,342 ft.; 3,150 ft. O.I.H. in 8 hrs.
Ralph Wixson et al No. 1 Peterman, SW cor. sec. 28-17-10w. T.D. 3,306 ft.; est. ¼ B.O.P.H.

Greenwood County

Landon & Mendenhall No. 1 Slough, NE SW sec. 9-24-13e. Drlg. 1,675 ft.
John Nichols et al No. 1 Central Life, SE SW sec. 35-25-12. Spd. and S.D.
C. C. Whitaker et al No. 1 Bressner, NW SE sec. 8-26-13e. Drlg. 300 ft.

Harper County

Franklin Drlg. Co. No. 1 Waits, NE SW sec. 24-34-6w. S.D. 4,185 ft.

Harvey County

National Ref. Co. No. 1 Brown Bros., NW SE NE sec. 22-23-2w. Arb. 3,501-15 ft.; D.&A.

Jewell County

Hollingsworth Bros. No. 1 Wolfe, NE SW SE sec. 14-4s-8w. S.D. 100 ft.

Lane County

Phillips Pet. Co. No. 1 Kees, C SE SE sec. 3-19-30w. S.D. 4,885 ft.

McPherson County

Archer & Crane No. 1 Templin, NW SW SE sec. 32-17-3w. C.O. 3,201 ft.
Darrah et al No. 1 Decker, SW SW SE sec. 12-21-2w. Drlg. 2,875 ft.

Meade County

Pacific Mid-West Co. No. 1 Rexford, NE SE SW sec. 8-30-29w. S.D. 200 ft. (cor.).

Ness County

Marshall Drlg. Co. et al No. 1 Anderson SW NW sec. 23-16-24w. Spd. and S.D
Trojan O. & G. Co. No. 1 Moses, C SW NW sec. 10-18-25w. S.D. 500 ft.
Trojan O. & G. Co. No. 1 Page Milling Co. SE SE NW sec. 36-18-26w. C.O. 3,265 ft.

Phillips County

C. W. Davidson et al No. 1 Elliff, SE NE NE sec. 35-5-18w. S.D. 600 ft.

Pratt County

Cities Service Oil Co. No. 1 Delaney, CNL S½ NE sec. 13-26-12w. Drlg. 2,820 ft.

Reno County

Carey et al No. 1 McPheeters, NE NW sec. 22-26-8w. Drlg. 3,637 ft.
Cities Service Oil Co. No. 1 Krele, C NW sec. 27-23-10w. Drlg. 3,390 ft.
McCole et al No. 1 Mathews, SW NW NW sec. 15-24-10w. Drlg. 2,340 ft.

Rice County

Cities Service Oil Co. et al No. 1 Habiger, SW NW sec. 18-18-9w. Drlg. 2,872 ft.
Price et al No. 1 Gemeinhardt, NE SE sec. 18-18-10w. T.D. 3,298 ft.; acd.; pmpd. 2 B.O. in 45 min. and 1% wtr.
Sam Schneider et al No. 1 Sterling College, SE SW SE sec. 28-20-8w. Drlg. 3,120 ft.

Rooks County

Duwe & Farris No. 1 Hancock, NW SW SW sec. 21-10-18w. Drlg. 3,390 ft.
Elwell et al No. 1 Zimmerman, NE NW sec. 15-9-18w. Drlg. 3,350 ft.
Graham et al No. 1 Pike, SW cor. sec. 9-9-17w. S.D. 3,370 ft.
Producers Oil Co. No. 1 Ham, SW SW NW sec. 25-7-19w. Set 12-in. 312 ft. (cor.); S.D. 330 ft.

Rush County

Duwe & Brouk No. 1 Lebsack, SE SE NE sec. 13-16-16w. Sil. 3,492-95 ft.; 1,500 ft sulfur water in hole in 2¼ hrs.; T.D 3,512 ft.; S.D.O.

Russell County

Emrichs et al No. 1 Anderson, NE SE SW sec. 33-15-11w. Spd. and S.D
Hess et al No. 1 Reinhardt, NE SW sec. 36-12-14w. Drlg. 2,950 ft.
Jones & Shelbourne et al No. 1 Kuhnle, SE NW sec. 4-15-12w. Drlg. 1,396 ft.
Parke et al No. 1 Gorham Est., SW NW sec. 19-15-15w. Drlg. 650 ft.
Simpson et al No. 1 Boxberger, NE SE NW sec. 10-15-14w. S.D. 150 ft.
G. A. Stearns et al No. 1 Stielow, NW cor. sec. 32-11-14w. Drlg. 1,500 ft.
Winkler & Koch No. 1 Jones, SE SE NW sec. 22-14-13w. Sil. 3,180 ft.; S.D.O.

Sedgwick County

Frank Hudson et al No. 1 Fulton, NE SE sec. 35-28-1e. Fsg. 1,550 ft.
McKnab No. 1 Garrett, SE SW SW sec. 18-29-2e. Drlg. 2,477 ft.
Steinbuchel et al No. 1 McAdams, SW NE sec. 28-20-1e. Arb. 3,771-90 ft.; D. &A.
Union O. & R. Co. et al No. 1 Howell, SW cor. sec. 6-29-1e. Fsg. 2,410 ft.

Stafford County

Carter Oil Co. No. 1 Andress, CNL SE sec. 2-21-13w. Wtr. 3,605-08 ft.; D.&A.
Cardinal Oil Co. et al No. 1 Sittner, SW cor. sec. 4-22-12w. T.D. 3,700 ft.; acd.; swbd. 30 B.W. and 5 B.O. in 30 hrs.
Ted Hamilton et al No. 1 Hitz, NE NW sec. 23-22-13w. Arb. 3,832 ft.; T.D. 3,851 ft.; D.&A.
Hipple et al No. 1 Moses, NW SW sec. 9-22-13w. H.F.W. 3,804-07 ft.; P.B. 3,635 ft.; D.&A.
National Ref. Co. No. 1 Bonham, SW SE sec. 28-25-12w. Set 8-in. 3,605 ft.; R. U.S.T.
Stanolind O. & G. Co. No. 1 Hahn, NE NW sec. 14-22-13w. S.O. 3,495-98 ft.
Stanolind O. & G. Co. No. 1 Hill, NE SW sec. 2-23-12w. Cg. 3,734 ft.

Sumner County

Cities Service Oil Co. No. 1 McCoy, SE SW sec. 11-35-2e. Drlg. 3,690 ft.
Saco Oil Co. No. 1 Phipps, SW SE NE sec. 24-30-1w. Spd. and S.D.
E. B. Shawver No. 1 Stewart, NW SE sec. 4-32-3w. Circulating 4,380 ft.

Trego County

Carlock No. 1 Kinzel, SW SW sec. 9-13-22w. Spd. and S.D.
Manning & Martin No. 1 Lynd, NW SW sec. 16-11-21w. Rng. 10-in. 1,680 ft.

NEBRASKA WILDCATS

Arab Pet. Corp. et al No. 1 Ogle, SE SE sec. 9-1n-14e. Viola 3,019 ft.; T.D. 3,424 ft.; D.&A.

OKLAHOMA

Week Ending February 26

NORTHERN OKLAHOMA

Beckham County

Mid-American Oil Co. No. 1-A Biscoe, SW cor. sec. 28-8-22w. Drlg. 2,669 ft.

Cleveland County

W. A. Delaney et al No. 1 Bugher, SE SE SW sec. 12-7-2w. Rig.
Harper-Turner No. 1 Pollock, C W½ NW NW sec. 13-9-2w. Drlg. 7,293 ft.

Caddo County

Indian Terr. Illum. Oil Co. No. 1 Dome-Bo, C NE SE sec. 29-6-10w. T.D. 6,900 ft.; D.&A.

Comanche County

Clyde Roach No. 1-A Green, SE-SE SW sec. 2-1n-13w. S.D. 595 ft.

Creek County

M. W. Mosier et al No. 1 Holcomb, SE SW NW sec. 19-18-8. T.D. 3,018 ft.; 2,000 ft. W.I.H. and S.S.O.; S.D.

Garfield County

H. R. Hollenback et al No. 1 Clark, NW cor. sec. 34-21-6w. Second Wilcox 7,298 ft.; T.D. 7,336 ft.; perf. csg. 7,259-70 ft.; made head flow; est. 10 B.O. P.H. and 3,000,000 ft. of gas; S.I.; may acidize.

Garvin County

B. C. D. Edwards No. 1 Clark, NE cor. sec. 16-3n-3e. T.D. 2,676 ft.; P.B. 2,088 ft.; perf.; swb. 6 bbls. fluid in 1 hr.; est. half wtr.; R.U.S.T.

Grady County

Doyle Pet. Co. No. 1 Huffine, NW NW SE sec. 30-5-8w. Drk.
Gulf Oil Corp. No. 1 Thomas, SW NW NW sec. 14-4-5w. Drlg. 10,722 ft.

Greer County

R. W. McDonald No. 1 Fite, SE SE sec. 34-7-21w. T.D. 1,002 ft.; U.R. csg.
J. I. Medlin et al No. 1 Broudie, NW cor. sec. 5-6n-20w. T.D. 90 ft.; (cor.); S.D.

Hughes County

Amerada Pet. Corp. and Stanolind O. & G. Co. No. 1 Preame, NW NW SE sec. 29-9-9. Drlg. 2,260 ft.
Homer Doup et al No. 1 Bank, NE NE NW sec. 7-7-9. S.D. 335 ft.
E. H. Moore et al No. 1 Hunter, NE NE NW sec. 30-4-9. Drlg. 220 ft.
Phillips Pet. Co. No. 1 Becker, NE NW SW sec. 8-5-10. T.D. 6,286 ft.; P.B. 5,760 ft.; set Baker plug 5,612 ft.; W. O.C.; R.U.S.T.
Troup & Strickland No. 1 Brown, NW SW NE sec. 32-6-8. Set 7-in. csg. 660 ft.; W.O.C.

Kay County

F. S. Freeland et al No. 1-A Watson, NE NW NW sec. 28-28-1w. Rig on ground.
E. J. Shaffer et al No. 1 McKee, NE NW sec. 20-28-1w. T.D. 2,500 ft.; S.D.

Kiowa County

Gauntt & Baker No. 1 Parks, NW NW SW sec. 29-7-20w. S.D. 720 ft.
Hughes & Reese No. 1 Fultz, SE cor. sec. 10-6-18w. T.D. 1,238 ft.; S.D.

Lincoln County

Stanolind O. & G. Co. and Amerada Pet. Corp. No. 1 Strader, NW NW NE sec. 18-13-3e. Cd. 3,637-50 ft.
Wilcox O. & G. Co. No. 1 Roger, SE SE NE sec. 18-14-6. Drlg. 1,800 ft.

Logan County

Arrow Drlg. Co. No. 1 Dodson, NW cor. sec. 23-17-1w. Set 6⅝-in. csg. 5,161 ft.; T.D. 5,234 ft.; W.O.C.
Stanolind O. & G. Co. No. 1 Blunt B, C W½ W½ NW sec. 6-14-3w. T.D. 6,495 ft.; may abd.

Okfuskee County

Broswood Oil Co. No. 1 Lehman, NW SW NW sec. 21-13-10. Dutcher 2,851-65 ft.; T.D. 2,866 ft.; swbd. 47½ B.O. in 24 hrs.; to pmp.

Oklahoma County

W. O. Allen et al No. 1 Jackson, C E½ SE NW sec. 6-14-3w. Cd. 6,610-20 ft.; oil stains; to D.D.

Okmulgee County

H. D. Detrick et al No. 1 McCann, NW SE SW sec. 33-14-11. Drlg. 1,000 ft.
Phillips Pet. Co. No. 1 Wood, NW SW SW sec. 31-11-13. Drlg. 3,665 ft.

Osage County

Norbia Oil Co. and Carter Oil Co. No. 1 Osage, NW cor. sec. 3-24-6. Drlg. 1,-987 ft.

Payne County

Helmerich & Payne No. 1 Ritchie, C NE NW sec. 34-18-1e. Drlg. 4,865 ft.

Pontotoc County

Cowley et al No. 1 McCormick, NW SW SW SE sec. 27-2n-4e. T.D. 222 ft.; S.D.
H. W. Lee No. 1 Weatherly, NW SE NW sec. 24-1n-7. Set 12½-in. csg. 243 ft.; S.D. 280 ft.
Jack Lynch et al No. 1-A Parker, SW SW SE sec. 17-4-8. T.D. 1,550 ft.; S.D.
Union Dev. Co. No. 1 Abbott, SW NW NE sec. 34-3-6. T.D. 3,320 ft.; fsg.

Pottawatomie County

Hall & O'Mara No. 1 Shaw, NE NE SE sec. 32-6-5. Cd. 2,335-45 ft.

Seminole County

C. E. Davis et al No. 1 Jones, NW NE SW sec. 34-6-5. T.D. 2,314 ft.
W. B. Pine No. 1 Wright, SE SE NE sec. 16-6-6. Set 10-in. csg. 109 ft.
Sunshine Oil Co. No. 1 Ferguson, SE SW NE sec. 7-7-8. Drlg. 4,421 ft.
H. V. Woodson and Marydun Oil Co. No. 1 Gilliland, SE SW sec. 24-11-7. T.D. 4,295 ft.; to drill to Wilcox.

Texas County

Hagey et al No. 1 Peck, C NE sec. 6-1n-13ecm. T.D. 2,842 ft.; C.O.
Harkendorf & Kuhn No. 1 Wiggins, C NW sec. 1-2n-14ecm. Drlg. 2,490 ft.

Washita County

L. B. McWhirter No. 1 fee, NW SW SW sec. 34-8-19w. T.D. 2,037 ft.; S.D.

SOUTHERN OKLAHOMA

Atoka County

Amerada Pet. Corp. and Stanolind O. & G. Co. No. 1 Ridgway, NE cor. sec. 24-3s-9. Drlg. 2,155 ft.
C. M. Sheldon and Gardner Pet. Co. No 1 Lee, NE NW SW sec. 2-4s-10e. S.D. 2,416 ft.

Bryan County

Southern Oil Co. No. 1 Henry, NW NW NE sec. 10-8s-7. Drlg. 4,120 ft.

Choctaw County

V. K. Chapman and T. N. Low No. 1 Hallum, NE NW NW sec. 4-7s-20. S.D. 675 ft.

Cotton County

Jim Turner et al No. 1-A Collins, SW NE NE sec. 18-4s-10w. Sd. 1,234 ft.; S.D. for csg.

Johnston County

W. T. Sheldon No. 1 Chapman, C NW NW sec. 26-4s-6e. T.D. 3,176 ft.; S.D.

Love County

Sinclair Prairie Oil Co. No. 1 Felts, NE cor. sec. 35-6s-2w. Drlg. 1,331 ft.

Stephens County

Coline Oil Co. No. 1 Johnson, C SW SE SE NE sec. 1-2n-8w. T.D. 10,000 ft.; P.B and drld. to 9,086 ft.; C.O. and swbg.
Helmerich & Payne No. 1 Pfile, SW cor sec. 1-2s-7w. T.D. 4,246 ft.; P.B. 4,020 ft.; S.D.O.
Robinson et al No. 1 Alexander, NW NE NW SE sec. 30-2n-4w. T.D. 380 ft.; abd.
Schmoerke No. 1-A Sadler, SW NW NW SE sec. 30-2n-4w. T.D. 580 ft.; abd.

Tillman County

Barney Cockburn et al No. 1 Nicholas, SE cor. sec. 28-2s-19w. O.W.D.D.; drlg. 3,025 ft.
H. I. Grimes et al No. 1 Laney, NW cor. sec. 3-3s-18w. T.D. 3,490 ft.; S.D.
M. G. Martin No. 1 Parris, NW NW SW sec. 3-3s-19w. T.D. 2,135 ft.; whipstk. 1,560 ft.; drlg. 1,965 ft.
Smith No. 2 Hammell, NE NW NW sec. 6-5s-15w. T.D. 1,581 ft.; S.D.

ARKANSAS

Cleveland County

J. T. Markwick and E. O. Olds No. 1 A. Vance, NW cor. NW sec. 18-11-11. S.D. 2,085 ft.

Columbia County

Kerr-Lynn Oil Co. No. 1 Barnett, sec. 14 17-20. Cd. hd. slightly porous L. 7,659-64 ft.; cd. 7,730 ft.; D.S.T. 7,664-72 ft.; rec. 5,400 ft. salt and sulfur wtr. in 27 min. on ⅝-in. cks.; T.&B.; arng. to run Schlumberger.
Standard Oil Co. of La. No. 1 Bodcaw-Barbara, NE cor. SE NW sec. 18-16-22. Drlg. sh. and sdy. L. 6,016 ft.
Standard Oil Co. of La. No. 1 S. T. Crone, NW cor. NW SE sec. 8-16-22. Drlg. sdy. sh. 5,153 ft.
Standard Oil Co. of La. No. 1 W. P. Phillips et al, 660 ft. N and W. C sec. 15-17-19. Drlg. sdy. sh. and bldrs. 1,350 ft.

Crittendon County

Manning & Martin No. 1 Cartwright, SW cor. sec. 16-7n-8e. S.D. 4,200 ft.

Desha County

Columbian Fuel Corp. No. 1 Cross, SW cor. sec. 34-8s-3w. R.U.

Lafayette County

Lillian Taubel et al No. 1 Tatum, NE cor. SE NW sec. 18-16-22. Drlg. strks. sd. 7,158 ft.

Little River County

Heenan & Coe No. 1 Waldrop, SE NW sec. 21-12-28. S.D. 1,960 ft.
Joe G. Strahan et al No. 2 Dierks Lbr. Co. S.D. for D.S. 2,260 ft.

Miller County—Rodessa

G. C. Grasty No. 1 Mitchell, NW sec. 11-20-28. Drlg. L. 5,080 ft.
Gulf Oil Corp. No. 1 Hanner, SE cor. sec. 16-20-24. Drlg. sh.&L. 5,420 ft.
R. Lacy No. 2 Grogan, E½ W½ sec. 15-20-28. Drlg. sh.&L. 3,903 ft.
W. M. Layton No. 1 McKellar, SE cor. W½ W½ sec. 15-20-28. Set 9⅝-in. csg. 2,037 ft.; drlg. L. 4,836 ft.
R. H. Long No. 3 Greer, NE SE sec. 10-20-28. Set 7-in. csg. 6,119 ft.; T.D. 6,155 ft.
McClanahan & Feazel No. 2 Eason, C N½ NW SW sec. 12-20-28. Drlg. 4,817 ft.
R. W. Newell No. 1 Thomas, NW SE sec. 12-20-28. Set 5½-in. csg. 6,130 ft.; T.D. 6,144 ft.; W.O.

Nivla Oil Corp. No. 1 Cross, SE cor. SE NE sec. 11-20-28. T.D. 6,106 ft.; set 7-in. csg. 6,104 ft.; perf. 6,040-95 ft.; acid.; W.O.S.R.
Texas Canadian Oil Corp. No. 2 Thomas, NE cor. NW SE sec. 12-20-28. Drlg. sh.&L. 5,050 ft.
Thompson & Jaffra No. 1-A Treadway, NW cor. SE SE NE sec. 10-20-28. Set 5½-in. csg. 6,119 ft.; T.D. 6,147 ft.
Sam Tillingsworth No. 1 Treadway, SW cor. SE SE NE sec. 10-20-28. Comp.: 20 B.P.H. on 1-in. ck.; 5½-in. csg. 6,115 ft.; T.D. 6,146 ft.

Nevada County

Bruce E. Wallace No. 2 Haynie, SE cor. sec. 5-14-21. S.D. fuel 1,060 ft.

Ouachita County

Copenhaven Oil Corp. No. 1 Evans, NE cor. NE SW sec. 20-11-19. S.D. 1,825 ft.
A. H. Tarver et al No. 1 Guy Smith, sec. 16-14-19. Tokio sd. 2,186-2,210 ft.; T.D. 2,331 ft.; W.O.

Pulaski County

A. L. Kitselman, No. 2 A. L. Kitselman Jr., SE SE SW sec. 2-1s-13e. S.D. 2,275 ft.

Union County—Shuler

Alice Sydney Oil Co. No. 1 Powledge, SE cor. SW SE sec. O.W.W.O.; old T.D. 6,005 ft.; drlg. red sdy. sh. 6,015 ft.
E. M. Jones No. 3 Marine Oil Co., NE NW SE sec. 17-18-17. Drk.
E. M. Jones et al No. 1-A Murphy Lbr. Co. T.D. 7,580 ft.; set 5-in. csg. 7,576 ft.
Lion Oil Ref. Co. No. 2 Marine Oil Co., SW cor. E½ SE¼ sec. 17-18-17. Drlg. 5,770 ft.
Lion Oil Ref. Co. No. 1 Mayfield, SE cor. Lot 3, Fract. NW¼ sec. 18-18-17. Set 10¾-in. csg. 2,295 ft.
Lion Oil Ref. Co. No. 1 Miller, SW cor NE NW sec. 18-18-17. Drlg. red and gr. sh. 5,890 ft.
Lion Oil Ref. Co. No. 4-A Edna Morgan, NW cor. Lot 1, SW sec. 18-18-17. Drlg. red and gr. sh. 6,210 ft.
Lion Oil Ref. Co. No. 5-B Morgan, SE cor. W½ SE sec. 18-18-17. Drlg. sdy. sh. 6,926 ft.
Lion Oil Ref. Co. No. 2-C D. S. and J. C. Morgan, SW cor. SE SE sec. 18-18-17. Drlg. 3,630 ft.
Lion Oil Ref. Co. No. 5-A E. Morgan, NE cor. Lot 7, SW sec. 18-18-17. Drlg. 3,540 ft.
Marine Oil Co. No. 4 fee, NW cor. SW SW sec. 17-18-17. Drlg. red and gr. sh. 6,397 ft.
Marine Oil Co. No. 3 Justiss, NE cor Lot 7, NW sec. 18-18-17. Drlg. red and gray sh. 5,771 ft.
Marine Oil Co. No. 4 Justiss, cen. Lot 7 NW sec. 18-18-17. Set 7-in. csg. 7,719 ft.; T.D. 7,750 ft.
Marine Oil Co. No. 1 Miller, SE cor. Lot 1, NW sec. 18-18-17. Drlg. 2,121 ft.
Phillips Pet. Co. No. 1 First Natl. Bk. NE SW sec. 17-18-17. Set 7-in. csg. 7,607 ft.; T.D. 7,635 ft.; perf. 7,542-77 ft.; tstd. 478 bbls. fluid in 12 hrs., 30% drlg. mud and S.W.; P.B. to 7,522 ft.
Phillips Pet. Co. No. 1 Marine Oil Co., NE cor. NW NE sec. 20-18-17. Drlg. sdy. sh. 6,225 ft.
Phillips Pet. Co. No. 2 Rosen, SE cor. SW NE sec. 18-18-17. Drlg. red and gr. sh. 6,591 ft.
Texas Canadian Oil Corp. No. 1 Powledge, C NE NW NW sec. 21-18-17. Drlg. 2,440 ft.

Union County—Other

Ark. Southern Oil Corp. No. 2-A Simmons, SW cor. NE NW sec. 15-18-13. T.D. 2,307 ft.; O.I.H.; W.O.S.R.
E. G. Bradham No. 1 S. L. Robbins, SW cor. SW NE sec. 12-19-16. Spd.
Penn-Ark. Pet. Corp. No. 1 Rauiston, sec. 12-17-14. T.D. 3,175 ft.; S.D.; litigation.
W. D. Wingfield, Tr. No. 2 Kidd Est., SE cor. NW SW sec. 15-18-13. Sd. S.D. 2,257-2,300 ft.; set 6-in. csg. 2,250 ft.; T.D. 2,300 ft.

LOUISIANA

NORTH LOUISIANA PROVEN

Caddo—Rodessa

F. W. Burford No. 1 Brown, NE cor. SE sec. 5-23-16. Set 7-in. csg. 6,124 ft.; T.D. 6,130 ft.; swbg.; S.O.
J. S. Rushing No. 1 Alexander, NW cor. sec. 3-23-16. T.D. 5,347 ft.; cut D.S. at 3,600 ft.; rng. 7-in. csg. to 5,347 ft.
Shell Pet. Corp. No. 1-B Govt., SE cor. SW SE sec. 3-23-16. Drlg. L. 3,100 ft.
Standard Oil Co. of La. No. 1 Rodessa Oil & Ld. Co., NE cor. NE NE sec. 10-23-16. Cg. 5,915 ft.
Standard Oil Co. of La. No. 2 Spearman, SE cor. SE SE sec. 3-23-16. Drlg. rd. sh.&L. 4,295 ft.
Union Prod. Co. No. 7 Harris, NW cor. NE sec. 10-23-16. T.D. 5,850 ft.; conditioning mud.

N. LOUISIANA WILDCATS

Bienville Parish

Gulf Ref. Co. No. 1 Goodpine, sec. 25-14-8. Drlg. rd. sdy. sh. 8,474 ft.

Bossier Parish

L. W. Dennis No. 1 Roos, SW NW NW sec. 13-19-12. Perf. 840-42 ft.; tstd. S.W.; recmtd. 8¼-in. 855 ft.; T.D. 864 ft.
C. H. French No. 2 Larkin, NW cor. SE sec. 14-19-11. S.D. 225 ft.
Premier Inv. Co. No. 1 McDade, SE SW NE sec. 28-19-11. T.D. 1,655 ft.; lubricating 6-in. csg. to reset.
Triangle Drlg. Co. No. 2-A Herold, NW cor. sec. 13-17-12. Sat. L. 3,116-19 ft.; set 5½-in. csg. 3,110 ft.; T.D. 3,125 ft. comp.; 100 B.P.D. oil, and 300 B.P.D. S.W. on G.L.

Caddo Parish

Anderson & Gilbert No. 1 Pittman, SE cor. SW sec. 14-19-14. D.&A. 2,523 ft.
Ardsell Oil Co. and H. W. Russell No. 2 Muslow, sec. 26-21-16. O.W.W.O.; T.D. 2,246 ft.; set 5⅛-in. csg. 2,205 ft.; W. O.S.R.
W. D. Chew No. 4 Spell, SE sec. 20-21-15. S.D. 1,517 ft.; W.O.S.R.
L. T. Davis No. 3 Styles, SE cor. sec. 17-21-16. Set 8-in. csg. 1,015 ft.; W.O. S.R. 1,021 ft.
D.O.K. Oil Co. No. 1 Player, SE cor. NW SE sec. 26-21-5. O.W.W.O.; old T.D. 1,600 ft.; R.U. to dpn.
Double "I" Oil Co. No. 1 Goodwin, NW cor. sec. 33-21-15. Set 6-in. csg. 1,410 ft.; comp.; 5 B.P.D.; pmp.; T.D. 1,630 ft.
J. P. Driscoll et al No. 2 Muslow, SE cor. NE NW sec. 4-20-15. S.D. 1,700 ft.; high wtr.
W. D. Flynn No. 3 Natalie, SW cor. sec. 10-21-16. T.D. 1,029 ft.; W.O.S.R.
W. D. Flynn No. 4 Natalie, SE cor. sec. 10-21-16. R.U.
W. H. Harrison, Jr., No. 3 Crystal Shoreline, SW cor. SW NW sec. 25-21-16. Set 4-in. csg. 2,255 ft.; T.D. 2,264 ft.; W.O.S.R.
Louisiana Oil Prod. Co. No. 14-B Muslow, sec. 4-20-15. S.D. 2,130 ft.; high wtr.
Magnolia Pet. Co. No. 23 Dillon Hrs., NW cor. NE NE sec. 23-21-15. Set 7-in. csg. 1,487 ft.; T.D. 1,690 ft.
J. F. Mitchell No. 1 Muslow, NE cor. sec. 31-21-15. Tstg. 1,600 ft.
Olson Drlg. Co. No. 1 Sharp, C NW NE sec. 10-18-16. Drlg. sh.&L. 4,735 ft.
Petroleum Heat & Power Co. No. 1 Wemple, NW cor. sec. 14-20-15. Rng. csg. 2,210 ft.
W. G. Ray Drlg. Co. No. 5 Hunter, NE cor. sec. 17-19-14. R.U.
S. M. Richardson No. 2 Sentell, sec. 9-19-14. Set 7-in. csg. 2,437 ft.; tstg. 2,471 ft.
A. D. Robinson No. 1 Wilkinson, sec. 22-20-14. T.D. 2,805 ft.; P.B. 2,450 ft.; drld. out to set at 2,500 ft.; will test.
3-Sands Oil Co. No. 1 Player, 330 ft. S and E, C sec. 26-21-15. Set 4½-in. csg. 2,224 ft.; T.D. 2,233 ft.; comp.; 10 B. P.D. on pmp.
J. E. Sedberry No. 1 Dickinson, NW sec. 15-19-14. Set 6-in. csg. 2,443 ft.; W.O. S.R. 2,505 ft.
Raymond Wright No. 1 Hobbs, NE cor. sec. 29-21-15. Tstd. oil 1,635 ft.; arg. to acdz.
Simplex Oil Co. No. 6 Natalie, sec. 10-20-15. Set 10-in. csg. 80 ft.; S.D. 700 ft.

Claiborne Parish

Gulf Oil Corp. No. 1 McDonald, NW cor. SE NE sec. 2-20-5. Drlg. anhy. and sh. 3,826 ft.
Hollifield & McFarland No. 3 Patton Est., SE cor. SE NE sec. 2-20-5. Drlg. sh. 2,825 ft.
T. L. James No. 2 Fowler, NE SW sec. 32-21-4. T.D. 5,190 ft.; set 5½-in. csg.; comp.; 460 bbls. in 11 hrs.; ½-in. ck.
J. R. McMurray No. 2 Bean, sec. 32-21-4. R.U.
E. T. Oakes et al No. 2 L. Lloyd, SE SE sec. 3-20-5. R.U.
A. O. Olson et al No. 7-A Patton, sec. 30-21-4. Sat. L. 5,071-74 ft. and 5,077-80 ft.; set 7-in. csg. 5,070 ft.; T.D. 5,082 ft.; comp.; 65 B.P.H.; 24/64-in. ck.
Scout Oil Corp. No. 2 Bean, NE cor. SW sec. 32-21-4. Drlg. sh. 2,600 ft.
Sloan & Zook No. 2 Patton, SE NW sec. 1-20-5. Set 5½-in. csg. 5,355 ft.; T.D. 5,355 ft.; tstg.
Texas Canadian Oil Co. No. 1 Tanner, C N½ SE NE sec. 32-21-4. Drlg. 4,230 ft.
Tippett Oil Corp. No. 1 Aycock, SE sec. 1-20-5. Set 5½-in. csg. 5,342 ft.; T.D. 5,370 ft.
Union Prod. Co. No. 2 Brownfield, sec. 5-19-5. T.D. 9,964 ft.; sh.; recmtd. back to 8,850 ft.; rmg. bridge at 8,475 ft.
Union Prod. Co. No. 1-A Kilpatrick, sec. 11-19-6. Tstd. S.W. at 5,916-71 ft.; W.O. 6,077 ft.
G. H. Vaughn No. 3 King, C S½ sec. 30-21-4. Drlg. sh.&L. 4,635 ft.

De Soto Parish

A. P. Barrett No. 1 Jal Drlg. Co., NW cor. SE SW sec. 7-11-11. Set 6⅝-in. csg. 2,777 ft.; T.D. 2,809 ft.; comp.; 15 B.P.D.; perf. 2,682-2,768 ft.
Clear Lake Oil Co. No. 1 J. A. Woolum, NW sec. 29-12-12. Arng. to make D. S.T.
Pet. Heat & Power Co. No. 1 DeSoto

Corp., SE cor. SW NW sec. 7-11-11. Missed sd.; S.D.; T.D. sh. 2,868 ft.
Pet. Heat & Power Co. No. 1 Matthews, sec. 20-12-11. S.D. 2,685 ft.; high wtr.
Pet. Heat & Power Co. No. 2 Matthews, sec. 30-12-11. Drlg. sh. 2,473 ft.
Pet. Heat & Power Co. No. 1 Taylor, NE cor. NE SE sec. 12-11-12. T.D. 3,695 ft.; will P.B.
Pet. Heat & Power Co. No. 2 Taylor, sec. 12-11-12. Drk.
Pet. Heat & Power No. 1 Williams Est., NE cor. SW SE sec. 12-11-12. Cg. 2,740 ft.
Pet. Heat & Power No. 1 Williams, W. R., NW NE sec. 13-11-12. Drlg. sh. 960 ft.
Texas Co. No. 2 White, SW NE sec. 24-12-12. Set 4½-in. csg. 835 ft.

Franklin Parish

Southern Star Pet. Co. No. 2 Grayson, NE cor. NE SE sec. 36-12-6e. S.D. 1,754 ft.

La Salle Parish

Pet. Heat & Power Co. No. 1 Gaharan, Lot 7, Blk. 1, Holmes & Adams Addn., sec. 25-10-1e. Set 6-in. csg. 1,530 ft.; T.D. 1,541 ft.; W.O.S.R.
Stovall, Tr., No. 4 Russell, SE SE sec. 25-10-1e. 6-in. csg. at T.D. 1,518 ft.; W.O.S.R.

Lincoln Parish

F. H. Brown No. 2 Patton, C S½ SE SW sec. 6-20-4. R.U.
Compton & Hart No. 1 Patton Est., C N½ NW NE sec. 7-20-4. R.U.
Magnolia Pet. Co. No. 1 Patton Est., NE cor. NW sec. 7-20-4. Cg. sh.&L. 5,371 ft.
Magnolia Pet. Co. No. 1 Pollack, C N½ NE SE sec. 6-20-4. T.D. 5,327 ft.; comp. 26 B.P.H.; ¼-in. ck.
Magnolia Pet. Co. No. 2 Pollock, C S½ NE SE sec. 6-20-4. R.U.
E. T. Oakes & Easton No. 1 Griggs, sec. 36-18-1w. T.D. 6,259 ft.; reshot at 5,932-41 ft. with 40 qts. nitro.; fsg. for shooting wire.

Morehouse Parish

W. J. Furlong No. 1 Clark, sec. 10-20-7e. Set 9⅝-in. csg. 2,805 ft.; top Big L. 6,207 ft.; cg. hd. and soft stks. sd. 6,351 ft.

Natchitoches Parish

Jos. E. Popkins No. 1 Peavy Lbr. Co., NW sec. 36-7n-9w. R.U.; S.D.

Red River Parish

Glassell & Whitehurst No. 1 LeLong, NE NW NE sec. 25-12-11. W.O.; D.S. 1,810 ft.; rmg.
Yandell Rogers No. 5 Gaspair, SE SW sec. 27-13-11. Set 5⅛-in. csg. 2,453 ft.; T.D. 2,474 ft.; W.O.S.R.

Sabine Parish

Hunter Co. No. 2 Bowman, C SW NE sec. 12-17-13. Set 6-in. csg. 2,139 ft.; comp.; pmpg. and flwg. 108 B.P.D.; T.D. 2,564 ft.
Hunter Co. No. 1-B Long Bell Lbr. Co., C SE SW sec. 1-7-13. Drlg. 454 ft.
Major Oil Co. No. 1 Henry, SE cor. NE SW sec. 12-7-13. Drlg. 1,020 ft.
H. N. Morris No. 1 Irving & Bishop, C NW NW sec. 18-7-12. Set 12-in. at 80 ft.
Pearl Oil Corp. No. 7 Crawford, SW cor. SW SE sec. 20-9-13. Drlg. 820 ft.
W. L. Posey No. 1 Ramirez, C NW NW sec. 12-7-13. Drlg. 180 ft.
Sutton-Zwolle Oil Co. No. 1 Sabine Lbr. Co., SE cor. NW NE sec. 23-7n-14w. Set 9⅝-in. csg. 2,215 ft.; tstd. dry 2-450 ft.; drlg. 2,888 ft.

Union Parish

Standard Oil Co. of La. No. 1 Frost Lbr., sec. 14-21-1e. T.D. 7,005 ft.; M.I. hvy. rig; rmd. old hole; cg. hd. sh.&L. 7,-111 ft.

Webster Parish

S. W. L. Backus No. 4 Pardee Co., NE sec. 3-22-11. R.U.
Hunt Oil Co. No. 6 Babb, C NE SW sec. 14-21-10. Drlg. sh. 575 ft.
Hunt Oil Co. No. 8 Davis, C NW NE sec. 23-21-10. R.U.
Hunt Oil Co. No. 19 Hope, NW cor. sec. 24-21-10. O.W.W.O.; plg. lnr. to dpn.; 4,700 ft.
C. E. Lunsford No. 1 Turner, SW cor. SE sec. 20-20-8. S.D. 2,309 ft.
Magnolia Pet. Co. No. 1 Coyle-Tiner, C sec. 21-21-10. Drlg. sh.&L. 4,035 ft.
Magnolia Pet. Co. No. 2 Crichton, SE cor. NE NW sec. 33-21-10. Drlg. sh. 2,489 ft.
Ohio Oil Co. No. 5 Holloway, NE cor. SE NE sec. 23-21-10. O.W.W.O.; R.U. to deepen.
Magnolia Pet. Co. No. 2 Mixon, sec. 22-21-10. Top Bodcaw sd. 8,300 ft.; set 7-in. csg.; T.D. 8,320 ft.; comp.; 580 B. P.D. dist.; ¼-in. ck.; est. 7,000,000 ft. gas.
Magnolia Pet. Co. No. 1 Sexton Unit, NW SE sec. 32-23-9. Drlg. hd. sd.&sh. 7,-490 ft.
Midstates Oil Corp. No. 1 Welori Lbr. Co., C NW NW sec. 3-20-10. Loc.
Morgan et al No. 1-A Hope, C NW NW sec. 25-21-10. R.U.
North American Oil Co. and Root Pet. Co. No. 1 Coyle, NE SW sec. 23-21-10. Set 7-in. csg. 8,330 ft.; comp.; 25 B.P. H. dist.; ⅜-in. ck.; est. 6,000,000 ft. gas.
North American Oil Consol. Co. No. 1 Stewart, C SE NE sec. 32-27-10. Set 9⅝-in. csg. 5,866 ft.; drlg. sh. 6,484 ft.
Ohio Oil Co. No. 2 Bodcaw Acct. 4, SW SE NW sec. 24-21-10. Set 7-in. csg. 8,166 ft.; T.D. 8,222 ft.; comp.; 409 B. P.D. dist.; ⅜-in. ck.; est. 5,000,000 ft. gas.
Ohio Oil Co. No. 48 Bodcaw Acct. 2, SE sec. 15-21-10. Set 7-in. csg. 8,360 ft.; T.D. 8,410 ft.; csg. parted; sqze. job.
Ohio Oil Co. No. 49 Bodcaw (Acct. 3), C NW NW sec. 34-21-10. Set 13⅜-in. csg. 808 ft.; drlg. sdy. L. 4,861 ft.
Ohio Oil Co. No. 1 Crutsinger, NE cor. sec. 35-21-10. Drlg. L. 4,774 ft.
Ohio Oil Co. No. 23 Gray Acct. No. 1, SE sec. 27-21-10. Top Bodcaw 8,093-8,135 ft.; 7-in. at 8,100 ft.; T.D. 8,143 ft.
Ohio Oil Co. No. 24 Gray, NE cor. sec. 35-21-10. R.U.
A. G. Oliphant No. 1 Central Inv. Co., C NW SE sec. 33-21-10. Drlg. L.&sh. 5,290 ft.
A. G. Oliphant No. 1 Stewart, sec. 33-21-10. Drlg. L.&sh. 4,664 ft.
Stanolind O. & G. Co. No. 1 Pardee Co., SW NE sec. 36-21-10. T.D. 6,003 ft.; set 9⅝-in. csg. 5,992 ft.; drlg. plug.
Union Prod. Co. No. 1 Stewart, SE cor. SE sec. 28-21-10. Drlg. 6,101 ft.

Winn Parish

G. W. Ziegen No. 13 La. Cen. Lbr. Co., sec. 4-13-1e. 12-in. at 62 ft.; W.O.C.

SOUTH LOUISIANA FIELDS

Abbeville—Vermilion Parish

Continental Oil Co. No. 1 Faulk, sec. 66-12s-3e. 10¾-in. csg. 1,585 ft.

Anse La Butte—St. Martin Parish

Crusader Oil Co. No. 2 Central Oil Co., sec. 86-9s-5e. Drlg. sdy. sh. 2,015 ft.
Austin B. Taylor No. 5 Begnaud, sec. 117-9s-5e. 7-in. csg. 826 ft.; T.D. 1,689 ft.; P.B. 840 ft.; W.O.C.

Bay St. Elaine—Terrebonne Parish

F. J. LeBlanc No. 2 Wurzlow, sec. 17-22s-18e. S.D. 816 ft.

Bayou Blue—Iberville Parish

Humble O. & R. Co. No. 1 Schwing, sec. 67-9s-11e. Top sd. show oil 6,827 ft.; 7-in. csg. 6,828 ft.; T.D. 7,015 ft.; clnd. hole 6,782 ft.; T.A.
Humble O. & R. Co. No. 6 Wilbert Sons Lbr. Co., sec. 66-9s-11e. T.D. 225 ft.; stk. D.S.

Bayou Cocotrix—Terrebonne Parish

Shell Pet. Corp. No. 4-B Realty Operators, sec. 17-17s-15e. 10¾-in. csg. 2,-456 ft.; drlg. sh. 5,450 ft.

Bayou De Allemands—St. Charles Parish

Amerada Pet. Corp. No. 1 St. Charles Ld. Co., sec. 38-15s-20e. 10¾-in. csg. 2,698 ft.; top salt 9,255 ft.; T.D. 9,263 ft.; 7-in. csg. 7,200 ft.; Schlumberger shwd. **7¾ ohms, 130 millivolts; P.B. 6,940 ft.; perf. csg. 6,928-31 ft.; D.S.T. showed S.W.; slight gas show; squeezed off** perf.; set retainer at 6,886 ft.; drld. out to 6,940 ft.; perf. csg. 6,909-20 ft.; tstd. S.W.; set retainer 6,898 ft.; sqzd. off perf.; perf. csg. 6,810-15 ft.; shwd. S.D. on D.S.T.; sqzd. off perf.; perf. csg. 6,783-87 ft.; tstd. S.W.; sqzd. off perf.; prep. to test 5,545-55 ft.; tstd. S.W.; prep. to perf. csg. 5,425-28 ft.
Amerada Pet. Corp. No. 1 Gheens Realty Co., sec. 56-15s-20e. Spd.

Big Lake—Cameron Parish

Union Sulphur Co. No. 2 Miami Corp., sec. 19-12s-8w. T.D. 7,924 ft.; P.B. 7,-650 ft.; to sdtrk.

Black Bayou—Calcasieu Parish

Shell Pet. Corp. No. 40 Watkins. Cg. sd. 5,343 ft.; no report.

Edgerly—Calcasieu Parish

La. Crusader Oil Co. No. 1 La. Prairie, sec. 21-9s-11w. T.D. 5,108 ft.; P.B. and sdtrk.; T.D. 3,082 ft.; P.B. and S.T. 2,-350 ft.; T.D. 2,891 ft.; P.B. and sdtrkd.; drlg. sh. 2,530 ft.

Caillou Island—Terrebonne Parish

Texas Co. No. 1 L.L.&E., sec. 18-23s-20e. Drlg. sh. 1,273 ft.

Cameron Meadows—Cameron

Burton-Sutton Oil Co. No. 22 Sch. Ld., sec. 16-14s-13w. Drlg. sh. 3,597 ft.
Magnolia Pet. Co. No. 22 Cameron Meadows, sec. 21-14s-13w. Drk.

Chenevville—Rapides Parish

Amerada Pet. Corp. No. 4 Weil, sec. 53-1s-2e. T.D. 6,425 ft.; 9⅝-in. csg. 6,471 ft.

Charenton—St. Mary Parish

Pan American Prod. Co. No. 2 Robichaux, sec. 11-13s-9e. Drlg. sh. 1,790 ft.
Pan American Prod. Co. No. 3 South Coast Corp., sec. 30-18s-10e. Drlg. sh. &L. 5,758 ft.

Choctaw—Iberville Parish

Louisiana Crusader Oil Co. No. 1 E. B. Schwing, sec. 29-8s-11e. T.D. 8,969 ft.; well tried to blow out; stk. D.S.; fsg.
Standard Oil Co. No. 8 Gay, sec. 52-9s-11e. T.D. 6,125 ft.; fsg.

Darrow—Ascension Parish

Kiva Oil Co. No. 1 Duplessis, sec. 69-10s-2w. T.D. 60 ft.; S.D.
Humble O. & R. Co. No. 2 Landry, sec. 34-10s-2e. T.D. 6,952 ft.; 7-in. csg. 6,-941 ft.; I.P. 576 B.P.D. through ¼-in. ck.

Dog Lake—Terrebonne Parish

Texas Co. No. 21 State, sec. 5-22s-16e. T.D. 7,174 ft.; P.B. 5,500 ft.

Fausse Point—Iberia Parish

Texas Co. No. 4 State, sec. 35-11s-8e. 18⅝-in. csg. 90 ft.; top sd. 7,912 ft.; top salt 6,595 ft.; T.D. 6,765 ft.; salt.

Four Isle—Terrebonne Parish

Texas Co. No. 9 L.L.&E., sec. 24-21s-16e. T.D. 8,553 ft.; P.B. 3,881 ft.; sdtrk.; T.D. 6,943 ft.; 9⅝-in. csg. 6,870 ft.; drlg. sh.&L. 9,088 ft.

Garden Island—Plaquemines Parish

Texas Co. No. 18 State, sec. 37-23s-33e. T.D. 5,064 ft.; stuck D.S.
Texas Co. No. 26 state, sec. 37-23s-33e. Drlg. sh. 5,183 ft.

Gillis—Calcasieu Parish

Fohs Oil Co. No. 1-A Castle, sec. 14-9s-8w. Drlg. sh. 1,327 ft.
Union Sulphur Co. No. 6 Kaufman, sec. 13-9s-8w. T.D. 9,021 ft.; abd.

Hackberry—Cameron Parish

W. T. Burton No. 3 Lewis, sec. 22-12s-10w. R.U.
W. T. Burton No. 3 Vincent, sec. 22-12s-10w. R.U.R.
F. J. LeBlanc No. 1 Doiron, sec. 36-12s-10w. T.D. 3,780 ft.; 5-in. csg. 3,758 ft.
Stanolind O. & G. Co. No. 8 Carter & Sweeney, sec. 22-12s-10w. R.U.
Stanolind O. & G. Co. No. 10 Carter & Sweeney, sec. 22-12s-10w. R.U.; (cor.).
Stanolind O. & G. Co. No. 8 Duhon, sec. 22-12s-10w. T.D. 3,290 ft.; 7-in. csg. 3,229 ft.; swbg.
Superior Oil Co. No. 1 Benson-Vincent, sec. 30-12s-10w. Drlg. sdy. sh. 4,461 ft.
Texas Co. No. 24-B State, sec. 12s-9w. Drlg. clay 120 ft.
Union Sulphur Co. No. 1 Doiron, sec. 37-12s-10w. T.D. 4,888 ft.; 7-in. csg. 4,876 ft.; heaving sh. 5,940 ft.; P.B. 2,750 ft.; perf. csg. 2,744-47 ft.; made sqze. job; W.O.C.
York Oil Field Supply No. 3 Vincent, sec. 28-12s-10w. T.D. 2,947 ft.; P.B. 2,895 ft.; P.B. 2,848 ft.; to sdtrk.; drlg. sd. &sh. 3,219 ft.

Horseshoe Bayou—St. Mary Parish

Texas Co. No. 1 St. Mary Parish Ld. Co., sec. 37-17s-9e. 13⅜-in. csg. 1,837 ft.; drlg. sh.&L. 8,646 ft.

Jeanerette—St. Mary Parish

Herton Oil Co. No. 2 Carter, sec. 38-13s-9e. T.D. 9,939 ft.; 7-in. csg. 9,937 ft.; drlg. sh. 10,032 ft.
Herton Oil Co. No. 1 Teche Sugar Co., sec. 58-13s-8e. 7-in. csg. 9,884 ft.; T.D. 11,634 ft.; abd.

Jennings—Acadia Parish

Fred I. Getty No. 1 Jennings fee, sec. 46-9s-2w. T.D. 1,871 ft.; 6⅝-in. csg. 1,591 ft.; T.D. 2,057 ft.; stuck screen. P.B. and sdtrkd.; drlg. sh. 1,600 ft.
Gulf Ref. Co. No. 39 Arnaudit, sec. 47-9s-2w. T.D. 4,840 ft.; P.B. 2,585 ft.; T.D. 4,586 ft.; 9⅝-in. csg. 4,578 ft.; drlg. rk. 4,948 ft.
Jolly Pet. Co. No. 2 McFarlain, sec. 41-9s-2w. Drlg. sd. 1,388 ft.
Pet. Heat & Power Co. No. 1 Iowa-Jennings, sec. 45-9s-2w. R.U.R.
Shell Pet. Corp. No. 3 Community, sec. 40-9s-2w. T.D. 7,492 ft.; fsg.; P.B. 7,032 ft.; flwg. small amt. of oil through 10/64-in. ck.
Stanolind O. & G. Co. No. 19 Houssiere-Latrelle, sec. 47-9s-2w. T.D. 6,448 ft.; P.B. 6,135 ft. to strtn. hole; T.D. 6,979 ft.; P.B. 6,700 ft.; drlg. sh.&L. 6,908 ft.
Superior Oil Co. No. 1 Julis Clement, sec. 46-9s-2w. T.D. 7,324 ft.; D.S. stuck; P. B. to sdtrk.; oil sd. 7,028-88 ft.; T.D. 6,934 ft.; D.S. stk.
Superior Oil Co. No. 3 Iowa-Jennings, sec. 41-9s-2w. T.D. 6,847 ft.; 7-in. csg. 6,757 ft.
Superior Oil Co. No. 6 Jennings-Heywood, sec. 41-9s-2w. Drlg. sh. 5,856 ft.
Superior Oil Co. No. 9 Leckelt, sec. 42-9s-2w. T.D. 7,480 ft.; P.B. 5,302 ft.; drlg. sh. 6,409 ft.
Superior Oil Co. No. 11 Leckelt, sec. 42-9s-2w. Drlg. sh. 4,559 ft.
Superior Oil Co. No. 12 Leckelt, sec. 42-9s-2w. R.U.
Victor Weisse No. 1 Clement, sec. 46-9s-2w. **Top salt 3,819 ft.; S.D. 3,938 ft.** D.S. stk.; T.D. 3,139 ft.; fsg.

Lafitte—Jefferson Parish

Texas Co. No. 1 Marrero Land & Investment Co., sec. 20-17s-24e. 13⅜-in. csg. 1,937 ft.; T.D. 10,275 ft.; 7-in. csg. 9,-700 ft.; I.P. 1,783 B.P.D.; ⅜-in. ck.; T.P. 1,525 lbs.
Texas Co. No. 2 Marrero Ld. & Inv. Co., sec. 21-17s-24e. Cg. sdy. sh. 9,548 ft.
Texas Co. No. 9 Rigolet-Cooperation Fur Co., sec. 29-17s-24e. R.U.

Lake Hermitage—Plaquemines Parish

Gulf Ref. Co. No. 7 Lafourche, sec. 12-18s-25e. 7-in. csg. 8,074 ft.; T.D. 9,786 ft.; sdtrkd. hole; T.D. 9,770 ft.; perf. csg. 9,275-85 ft.; P.B. 9,197 ft.; perf. csg. 9,170-85 ft.; make D.S.T.

Lake Long—Lafourche Parish

Fohs Oil Co. No. 2 State, sec. 65-17s-19e. R.U.

Lake Pelto—Terrebonne Parish

Texas Co. No. 20 State, sec. 8-23s-18e. T.D. 6,478 ft.; 7⅝-in. csg. 6,362 ft.

Lirette—Terrebonne Parish

Humble O. & R. Co. No. 1 Frank Wurzlow sec. 6-19s-19e. 13⅜-in. csg. 2,796 ft. T.D. 11,347 ft.; abd.
Humble O. & R. Co. No. 1 Wurzlow, sec. 32-19s-19e. Drk.
Union Prod. Co. No. 1 Fundenburk, Unit 1, sec. 50-19s-19e. Drlg. 1,080 ft.

New Iberia—Iberia Parish

Wm. Helis No. 5 Bolivar, sec. 56-12s-7e. T.D. 4,337 ft.; salt; P.B. and sdtrkd.; drlg. sh. 3,008 ft.
Wm. Helis No. 4 Schwing, sec. 56-12s-7e. Drlg. sh. 1,450 ft.
Texas Co. No. 10-B Hanzen, sec. 54-12s-7e. T.D. 4,925 ft.; salt; S.D.

North Crowley—Acadia Parish

Humble O. & R. Co. No. 1 Daly, sec. 44-8s-1e. T.D. 9,083 ft.; abd.
Humble O. & R. Co. No. 2 Federal Ld. Bk., sec. 34-8s-1e. T.D. 7,925 ft.; tstd. S.W.
Humble O. & R. Co. No. 1 Traham, sec. 3-9s-1e. Drlg. sdy. sh. 5,490 ft.
Humble O. & R. Co. No. 2 Habetz, sec. 45-8s-1e. Drk.

Port Barre—St. Landry Parish

Pan American Prod. Co. No. 4 Cormier, sec. 4-6s-5e. R.U.

Quarantine Bay—Plaquemines Parish

Gulf Ref. Co. No. 4 State, sec. 17-19s-17e. Drlg. sd.&sh. 2,283 ft.; (cor.).

Roanoke—Jeff Davis Parish

Humble O. & R. Co. No. 10-B Devilbiss, sec. 11-9s-4w. T.D. 8,850 ft.; 7-in. csg. 8,850 ft.; I.P. 29 B.P.H.; ¼-in. ck.
Humble O. & R. Co. No. 11-B Devilbiss, sec. 11-9s-4w. R.U.

Sorrento—Ascension Parish

Sorrento Oil Co. No. 1 L. L. Barnard et al, sec. 16-10s-4e. 10¾-in. csg. 1,070 ft top salt 4,102 ft.; S.D. 4,166 ft.; salt.

South Elton—Jeff Davis Parish

Stanolind O. & G. Co.-Amerada Pet. Corp. No. 3-B Calcasieu Natl. Bank, sec. 27-7s-3w. T.D. 9,154 ft.; conditioning hole; 9⅝-in. csg. 8,647 ft.; drlg. sh. 10,181 ft.

Starks—Calcasieu Parish

Capital Oil Co. No. 1 Lutcher-Moore, sec. 24-9s-13w. R.U.

Sulphur—Calcasieu Parish

Union Sulphur Co. No. 852 fee, sec. 29-9s-10w. T.D. 5,068 ft.; P.B. and sdtrkd.; T.D. 5,193 ft.; salt; P.B. 1,703 ft.; drlg. sh. 2,320 ft.
Union Sulphur Co. No. 858 fee, sec. 29-9s-10w. Core sd.; odor oil 5,020 ft.

Valentine—Lafourche Parish

Wm. Helis No. 1 Valentine-Sugars, Inc., sec. 2-17s-20e. Drlg. sh. 1,700 ft.
Pan American Prod. Co. No. 1-B Community, sec. 58-17s-20e. Drlg. sh. 7,-419 ft.
Pan American Prod. Co. No. 16 Harang, sec. 7-17s-20e. T.D. 7,236 ft.; P.B. and sdtrkd.; drlg. sh. 2,221 ft.
Pan American Prod. Co. No. 17 Harang, sec. 9-17s-20e. Drlg. sh. 3,325 ft.

Venice—Plaquemines Parish

Tide Water Oil Co. No. 5 Manhattan Fruit Co., sec. 26-26s-30e. Top oil sd. 7,250 ft.; T.D. 7,300 ft.; P.B. 4,800 ft.; sdtrkd. at 4,813 ft.; drlg. sh.&shells 5,460 ft.
Tide Water Asso. Oil Co. No. 6 Manhattan Ld. & Fruit Co., sec. 26-21s-30e. Drlg. sh.&sd. 2,732 ft.

Vinton—Calcasieu Parish

M. McLean No. 17 Gray, sec. 35-10s-12w. R.U.
J. V. Redick No. 1 Vincent, sec. 34-10s-12w. T.D. 2,312 ft., oil sd.; 7-in. csg. 2,285 ft.; bailing; drld. out 2,498 ft.; I.P. 150 bbls. fluid, 50% S.W.; pmpg.
Sutton-Burton No. 1 Calcasieu Natl. Bk., sec. 3-11s-12w. T.D. 4,500 ft.; S.D.

Villa Platte—Evangeline Parish

Continental Oil Co. No. 1 N. H. Hirsch, sec. 44-3s-2e. Drlg. sh.&L. 7,433 ft.
Continental Oil Co. No. 1 McDaniels, sec. 44-3s-2e. Drlg. sh.&L. 4,480 ft.
Continental Oil Co. No. 1 Tate, sec. 44-3s-2e. Drlg. sh.&shells 4,063 ft.

Welsh—Jeff Davis Parish

Howard Clayton No. 1 Walshe, sec. 21-9s-5w. Oil show 1,030-31 ft.; T.D. 1,215 ft.; balled dry; R.U. to pmp.; no ga.
Stanolind O. & G. Co. No. 1 W. B. Conover, sec. 20-9s-5w. 13⅜-in. csg. 2,-017 ft.; drlg. sh.&L. 4,860 ft.

White Castle—Iberville Parish

Shell Pet. Corp. No. 6 Shingle. Drlg. sh. 5,368 ft.

Woodlawn—Jeff Davis County

Union Sulphur Co. No. 2 Calcasieu Natl. Bk., sec. 12-9s-6w. Drlg.sd.&sh. 4,553 ft.

S. LOUISIANA WILDCATS

Acadia Parish

H. E. Dalton No. 1 Setting, sec. 17-7s-1w T.D. 5,106 ft.; P.B. to approx. 500 ft T.D. 3,925 ft.; D.S. stuck.
Humble O. & R. Co. No. 1 Finch, sec. 22-10s-1e. T.D. 8,065 ft.; 9⅝-in. csg. 7,474 ft.

Calcasieu Parish

Republic Prod. Co. No. 1 Sabine Tram. Co sec. 25-18s-14w. 10¾-in. csg. 1,981 ft.; T.D. 9,620 ft.; hole clean; S.D.; high wtr.
Shell Pet. Corp. No. 1 Calcasieu Natl. Bk., sec. 18-11s-10w. Cg. sh. 8,246 ft.
Sun Oil Co. No. 1 Lutcher-Moore Lbr. Co., sec. 1-8s-13w. R.U.
Wheeler Oil Corp. No. 2 Sch. Ld., sec. 16 9s-7w. 15½-in. csg. 46 ft.; S.D. 641 ft.

Cameron Parish

Humble O. & R. Co. No. 1-B Miami Corp., sec. 7-14s-6w. 13⅜-in. csg. 2,-150 ft.; drlg. sd.&shells 5,645 ft.

Cameron Parish—Gulf of Mexico

Superior Oil Prod. Co. et al No. 1 State Gulf of Mexico, 3,800 ft. W, 6,200 ft. S of SE cor. of irregular sec. 4-15s-8w 10¾-in. csg. 1,157 ft.; 7⅝-in. csg. 7,-166 ft.; T.D. 9,394 ft., sd.; well at-

tempted to blow out; killed; D.S. stk. 8,800 ft.; fsg. at 7,096 ft.

East Baton Rouge Parish

Cavalier Oil Co. No. 1 Elliott, sec. 3-9s 2e. Drlg. L. 7,681 ft.

Austin B. Taylor No. 1 Duplantier, sec. 65-7s-1w. Spd.

Iberia Parish

Texas Co. No. 1 Bayless-Jones, sec. 58-12s-5e. Drlg. L. rk. 1,405 ft.

Texas Co. No. 2-B Vermilion Bay, sec. 20 16s-5e. T.D. 9,101 ft.; P.B. and sdtrkd at 5,788 ft.; T.D. 7,020 ft.; P.B. 6,385 ft.; to sdtrk.; T.D. 6,600 ft.; sdtrkd. 5,730 ft.; drlg. sh. 6,525 ft.

Lafayette Parish

Continental Oil Co. No. 1 Foreman, sec. 36-9s-3e. Drlg. sh. 7,064 ft.

Pointe Coupe Parish

Batchelor Oil Co. No. 1 Hackney, sec 28-3s-8e. 20-in. csg. 117 ft.; 13⅜-in. csg. 2,170 ft.; W.O.C.

St. Bernard Parish

Gulf Ref. Co. No. 3 State Lake, Twp. 12s-15e. R.U.

St. James Parish

Continental Oil Co. No. 1 Realty Operators, sec. 17-12s-17e. R.U.

St. Martin Parish

Carter & Stewart No. 2 Martin, sec. 32-9s-7e. T.D. 4,388 ft.; S.D.

Shell Pet. Corp. No. 1 Unit, sec. 11-14s 12e. Cg. sh. 8,393 ft.

Texas Co. No. 4 State Lake Mongoulois, sec. 14-10s-9e. Drlg. sh. 7,796 ft.

St. Mary Parish

Pet. Heat & Power Co. No. 9, sec. 9-13s-9e. S.D. 3,009 ft.

Terrebonne Parish

Fohs Oil Co. No. 1 Buckley & Bourg, sec. 77-19s-17e. T.D. 2,090 ft.; fsg.

Fohs Oil Co. No. 1 State, sec. 41-19s-19e. 18⅝-in. csg. 246 ft.; drlg. sh. 2,112 ft.

TEXAS

Week Ending February 26

GULF COAST FIELDS

Lockridge—Brazoria County

Gulf Oil Corp. No. 5 Carrie Baker, J. W. Hall Sur. No. 11. Bldg. drk.

Gulf Oil Corp. No. 3 Gibson, J. W. Hall Sur. T.D. 6,366 ft.; 7-in. csg. on bottom; tstg.

Gulf Oil Corp. No. 6-A Wilkes and Smith, J. W. Hall Sur. No. 11. Drk.

Gulf Oil Corp. No. 3-A G. L. Wood, T. Alsbury Sur. T.D. 6,368 ft.; 7-in. csg. on bttm.

Hastings Field—Brazoria County

Humble O. & R. Co. No. 10 R. D. Haden. R. Hoppel Sur. Cg. sh. 6,070 ft.

Humble O. & R. Co. No. 7 M. G. McDeed, H.T.&B. Sur. No. 30. T.D. 6,080 ft.; W.O.C.

Humble O. & R. Co. No. 8 W. G. McDeed, H.T.&B. Sur. No. 27. Drk.

Humble O. & R. Co. No. 6 W. H. Schindler, H.T.&B. Sur. No. 35. Drlg. L. 4,420 ft.

Stanolind O. & G. Co. No. 7 R. L. Autrey, H.T.&B. Sur. No. 37. 10¾-in. csg. 1,236 ft.; drlg. sh. 5,633 ft.

Stanolind O & G. Co. No. 10 F. N. Brown, H.T.&B. No. 29. Drk.

Stanolind O. & G. Co. No. 8 T. C. Edwards, Wm. Henry Sur. Drlg. sh. 2,032 ft.

Stanolind O. & G. Co. No. 8 Guido, H.T. &B. Sur. No. 36. Drk.

Stanolind O. & G.. Co. No. 6 Matsushita, H. Stevens Sur. R.U.

Stanolind O. & G. Co. No. 16 L. D. Shaw, H.T.&B. Sur. No. 36. Cg. sd. 6,023 ft.

Stanolind O. & G. Co. No. 2 G. Sheffield, H.T.&B. Sur. 10¾-in. csg. 1,236 ft.; drlg. sh. 4,524 ft.

Stanolind O. & G. Co. No. 3 H. M. Shyrock, H.T.&B. Sur. No. 29. Drlg. sh. 5,249 ft.

Stanolind O. & G. Co. No. 2 Velma Stockwell, H. Stevens Sur. Drk.

Stanolind O. & G. Co. No. 7 W. B. Wooster, A.C.H.&B. Sur. No. 1. T.D. 6,095 ft.; 7-in. csg. 6,095 ft.

Old Ocean—Brazoria County

Harrison & Abercrombie No. 5 Bernard, C. Breen Sur. 9⅝-in. csg. 7,000 ft.; drlg. sd.&sh. 8,786 ft.

Harrison & Abercrombie No. 1 Osberne, C. Breen Sur. Drlg. sh. 8,156 ft.

Harrison & Abercrombie Oil Co. No. 1 Troyer and West Texas Abst. Co., C. Breen Sur. Drlg. sh.&L. 6,636 ft.

Sandy Point—Brazoria County

Stanolind O. & G. Co. No. 3 J. A. Fite, D. Talley Sur. 9⅝-in. csg. 1,027 ft.; T.D. 6,500 ft.; 7-in. csg. on bttm.; perf. csg. 6,496½-98 ft.

West Columbia—Brazoria County

Adrian Moore No. 2 Gulf fee, George Tennille Sur. Drk.

Frost and Dunnan No. 1 E. S. Parker, Geo. Tennille Sur. Bldg. drk.

Mike Hogg No. 1 Varner, M. Varner Sur. Drlg. sh. 1,175 ft., (no report).

Sterling Oil & Ref. Co. No. 1 Powers et al, Geo. Tennille Sur. T.D. 5,912 ft.; 7-in. csg. 5,885 ft.

Texas Co. No. 20-A Abrams, George Tennille Sur. R.U.

Texas Co. No. 2 Goldman, G. Tennille Sur. Drlg. sh. 2,152 ft.

Texas Co. No. 7 J. G. Phillips, George Tennille Sur. R.U.

Texas Co. No. 1 T. Robinson, George Tennille Sur. T.D. 5,385 ft.; P.B. and [illegible]; T.D. 5,393 ft.; 7-in. csg. 5,198 ft.

Texas Co. No. 4 T. L. Smith, Geo. Tennille Sur. Drlg. sh. 4,205 ft.

Wallace Oil Co. and others No. 1 Hargrove, G. Tennille Sur. T.D. 1,100 ft.; W.O.C.

Calhoun—Heyser—Victoria County

Blanco Oil Co.-Buchannan No. 8 C. S. Dunwoody. Drlg. sh. 2,630 ft.

Geo. Echols No. 8 W. H. Bennett, J. E. Galban Sur. Drk.

Geo. Echols No. 4 Lander, J. Galban Sur. T.D. 6,038 ft.; tstg.

George Echols No. 5 O. M. Lander, J. E. Galban Sur. Drk.

Gulf Oil Corp. No. 2 R. R. Bonner, J. E. Galban Sur. Drlg. 4,630 ft.

Gulf Oil Corp. No. 3-B T. P. Traylor, J. E. Galban Sur. Drlg. sh. 4,839 ft.

Gulf Oil Corp. No. 4-B C. P. Traylor, J. Galban Sur. Drk.

Magnolia Pet. Co. No. 6 O. M. Lander, J. E. Galban Sur. Drlg. sh. 5,689 ft.

Sun Oil Co. No. 7 W. N. Coffey, G. E. Galban Sur. Drlg. sh. 5,276 ft.

Cedar Bayou—Chambers County

Merit Oil Co. No. 1 Winfree, C. Smiths Sur. Drlg. sh. 3,510 ft.

Seabreeze—Chambers County

Sun Oil Co. No. 1 R. J. Barrow, A. Yarbo Sur. R.U.

Sun Oil Co. No. 1 Seabreeze Ld. Co., H.T.&B. Sur. 102. 10¾-in. csg. 1,948 ft. T.D. 8,889 ft.; S.W. sd.

Sun Oil Co. No. 1 J. T. White, sec. 118, H.T.&B. Sur. Core sh.&sd. 6,050 ft.

Silsbee—Hardin County

Humble O. & R. Co. No. 1 B. L. Kirkendall. NE offset to No. 1 Howell. Loc.

Republic Prod. Co.-Houston Oil Co. No. 28 Brooks, G. W. Banks Sur. R.U.

Clinton—Harris County

Stanolind O. & G. Co. No. 1 Nora Barraco, Reels & Troubough Sur. T.D. 2,760 ft.; 9⅝-in. csg. 2,509 ft.

Eureka—Harris County

Jack Frazier No. 1 Bollmer & Neimann, J. Reinerman Sur. Prep. to spd.

Fairbanks—Harris County

Amerada-Stanolind O. & G. Co. No. 1 E. M. White, Geo. Ayers Sur. Drk.

E. L. Smith and H. B. Ownby Drlg. Co. drlg. sh. 5,116 ft.

H. E. Williams No. 1 A. Vega. G. Williams Sur. 10¾-in. csg. 850 ft.

Friendswood—Harris County

H. C. Cockburn et al No. 1 H. C. Cockburn, Wm. K. Smith Sur. Drlg. sh. 5,657 ft.

Humble O. & R. Co. No. 5 Scott Beamer, T. Choate Sur. T.D. 6,082 ft.; fsg.

Humble O. & R. Co. No. 1 H. Goodwin, W. K. Smith Sur. Drk.

Humble O. & R. Co. No. 6 E. A. Gray, Perry & Austin Sur. Drk.

Humble O. & R. Co. No. 1 J. L. Jones and E. A. Gray, Perry and Austin Sur. T.D. 6,042 ft.; W.O.C.

Humble O. & R. Co. No. 1 J. L. Jones, Perry & Austin Sur. Drk.

Humble O. & R. Co. No. 3 Keisling, T. Choate Sur. T.D. 6,048 ft.; 7-in. csg. 5,855 ft.

Humble O. & R. Co. No. 1 W. H. Moore, W. D. C. Hall Sur. Drk.

Humble O. & R. Co. No. 1 Robt. Perry and Austin Sur. T.D. 6,041 ft.; run 7-in. csg.

Humble O. & R. Co. No. 2 J. J. Settegas, Perry & Austin Sur. T.D. 6,040 ft.; W.O.C.

Humble O. & R. Co. No. 1 E. E. Watson. Drk.

Hitchcock—Galveston County

N. W. Hunter No. 2 M. Stewart, J. Spillman Sur. T.D. 5,250 ft.; P.B. 1,500 ft.; drlg. sh. 2,526 ft. in sdtrkd. hole.

LaBelle—Jefferson County

Sun Oil Co. No. 3 Broussard-Hebert, B. Blackman Sur. Drlg. sh. 5,379 ft.

North Cheek—Jefferson County

Magnolia Pet. Co. No. 3-A Phelan, S. Stevers Sur. Crooked hole; cg. sh. 8,792 ft.

Red Bank Oil Co. No. 1 Maco Stewart, Lot 6, Blk. S, Cook and Stewart Subd., John D. Moore Lge. M.I.M.

Hardin—Liberty County

Ark. Fuel Oil Co. No. 1 W. J. Green, A. B. Hardin Sur. Drlg. sh. 5,237 ft.

Atlantic Ref. Co. No. 1 J. V. Cessna, H. B. Johnston Sur. T.D. 7,600 ft.; tstg.

Atlantic Ref. Co. No. 2 W. McMurtry, H. B. Johnson Sur. Spd.

Jack Frazier No. 1 Buffam-Benning, J. Robeson Sur. 10¾-in. csg. 1,258 ft.

Gulf Oil Corp. No. 1 J. C. Barfield, H. B. Johnson Sur. Drlg. sh.&L. 3,067 ft.

Gulf Oil Corp. No. 1 M. F. Tullos, H. B. Johnston Sur. R.U.

Halliburton Oil Prod. Co. No. 1 Hanchev, H. B. Johnson Sur. Drlg. sh. 4,186 ft.

Humble O. & R. Co. No. 1 W. McMurtry, H. B. Johnson Sur. Drlg. sh. 4,629 ft.

McAlester Fuel Oil Co. No. 2 V. B. Hinson, H. B. Johnson Sur. T.D. 7,630 ft.; perf. csg.; to test.

Sun Oil Co. No. 1 A. A. Hisey, H. B. Johnston Sur. Drlg. sdy. sh. 3,117 ft.

L. W. Wickes No. 2 Tullos, H. B. Johnston Sur. Drlg. sh. 5,187 ft.

Bay City—Matagorda County

Hamman Explr. Co. No. 2 Crooke, E. Hall Sur. Top sd. 9,660 ft.; cg. 10,280 ft.

Hamman Explr. Co. No. 2 G. M. Sloan, J. T. Belknap Sur. Drk.

Pan American Prod. Co. No. 1 Richers, I.&G.N. Sur. X-3. Cg. sh. 9,208 ft.

Smith & McDannald No. 2 Gaines, E. Hall Sur. Drlg. sh. 4,069 ft.

Buckeye—Matagorda County

United North & South Development Co No. 1 G.B.M., Cotton Lge. 7-in. csg. 8,667 ft.; T.D. 10,500 ft.; hole cleaned W.O.O.; P.B. to 7,300 ft.; to sdtrk.; T.D. 7,910 ft.; resetting to test.

Palacios—Matagorda County

Atlantic Ref. Co. & McCarthy No. 3 Foley Ld. Co., L. Goodwin Sur. 7-in. csg. 8,635 ft.; T.D. 8,743 ft.; rng.

Sun Oil Co. No. 1 F. K. Robeson, L. Goodwin Sur. Drk.

Call—Newton County

Houston Oil Co.-Republic Prod. Co. No. 3 Sabine Tram, H.&T.C. Sur. No. 37 Drlg. sdy. sh. 3,286 ft.

Orange—Orange County

J. M. Campbell No. 1 Scales, Wm. Dyson Sur. Drlg. sh. 5,646 ft.

Gulf Oil Corp. No. 1 O. Duhon, Wm. Dyson Sur. Drk.

Gulf Oil Corp. No. 1 Cora Granger, Wm. Dyson Sur. 10¾-in. csg. 1,637 ft.; T.D. 5,926 ft.; rng. csg.

Gulf Oil Corp. No. 1 Granger Wm. Dyson Sur. T.D. 5,951 ft.; 7-in. csg. 5,937 ft.; tstg.

Ryan and Thompson No. 1 Norwood, Wm. Dyson Sur. T.D. 6,480 ft.; S.D.

Shell Pet. Corp. No. 1 E. V. Loeffler, Wm. Dyson Sur. M.I.M.

Union Prod. Co. No. 2 Lutcher-Moore Dyson Sur. 9⅝-in. csg. 5,162 ft.; drlg. sh. 5,430 ft.

Segno—Polk County

Gulf Oil Corp. No. 2 Ragan, I.&G.N. Sur 15. T.D. 6,704 ft.; 9⅝-in. csg. 5,587 ft.

Gulf Oil Corp. No. 10 G. F. Wing, I.&G. N. Sur., sec. 15. T.D. 5,260 ft.; run csg.

Spurger—Tyler County

Republic Prod. Co.-Houston Oil Co. No 8 Hurd, N. Hurd Sur. 10¾-in. csg. 2,300 ft.; drlg. sh. 5,256 ft.

GULF COAST WILDCATS

Brazoria County

W. H. Christie et al No. 1 J. J. Settegast, F. Green Sur. R.U.

Albert Plummer No. 1 G. C. Street, H. M. Hunter Sur. R.U.

Pure Oil Co. No. 1 Clemons State Farm S. F. Austin 7½ Lge. 7⅝-in. csg. 1,955 ft.; drlg. sh. 3,536 ft.

Pure Oil Co. No. 1 Smith, S. F. Austin Sur. 9⅝-in. csg. 7,734 ft.; T.D. 9,830 ft.; heaving sh.; P.B. 9,100 ft.; prep. to sdtrk.

Texas Co. No. 4 Freeport Sulphur Co., C Arriola Sur. 10-in. csg. 1,214 ft.; T.D 3,900 ft.; P.B. 2,564 ft.; sdtrkd.; T.D 3,000 ft.; P.B. to sdtrk.; cd. sd. oil odor 3,539-48 ft.; T.D. 3,894 ft.; P.B. drlg. sh. 3,557 ft.

Burleson County

Red Bank Oil Co. No. 1 Coffield, E. Sante Sur. R.U.

Chambers County

A. A. Cameron et al No. 1 White, Solmon Brill Sur. R.U.

Leverne Decker et al No. 1 Broussard Trust, sec. 30, H.T.&C. Sur. R.U.

Fort Bend County

J. R. Spencer No. 1 H. Boyle, Thomas Westfall Sur. Loc.

Harris County

W. S. Howell No. 1 Root, A. McCormick Sur. S.D. 2,807 ft.

Humble O. & R. Co. No. 11 Rohlfs, John Sellers Sur. T.D. 8,116 ft.; abd.

Jackson County

Sam G. Harrison No. 1 J. Weodner, J. Williams Sur., Abst. 267. M.I.M.

Magnolia Pet. Co. No. 1 West Ranch, R. Musquez Sur. Drlg. brkn. sd. 6,957 ft.

H. J. Porter No. 1 J. W. Faust, Peter White Sur. Drlg. sdy. sh. 2,669 ft.

Jefferson County

I. E. Harwell No. 1 State, Gulf of Mexico. S.D. 4,050 ft.

Humble O. & R. Co. No. 1 State, Gulf of Mexico, sec. No. 8. R.U.

Matagorda County

Pierce Estate No. 1 Pierce, I.&G.N. Sur. No. 7. T.D. 6,624 ft.; flwg. 3 bbls. of oil and 8% S.W. per hr. through ½-in. ck.

Pierce Est. et al No. 1 Paul Kruger, Nel. C. Warren Sur. Drlg. sh. 5,510 ft.

Sun Oil Co. No. 1 Fred Robbins, C. H. Vandeveer Sur. Drlg. sh. 9,897 ft.

Polk County

C. E. Gates No. 2 I. O. Jackson, J. W. Abbey Sur. Spd.

S. W. TEXAS WILDCATS

Bastrop County

J. W. Bibb No. 1 Lentz, F. Wilkenson Sur. Top Austin Chalk with odor of oil 2,530 ft.; T.D. 2,514 ft.; 5½-in. csg. 2,443 ft. fsg. for tbg.

R. C. Franklin No. 2 Yarrington, Jose Manuel Bangs Sur. Drk.

Bee County

H. E. Pressy No. 1 F. H. Pressy, C. Williams Sur. T.A. 45 ft.

Bexar County

Hamill & Hamill No. 1 Brietzke, Marie Jose Rodriguez Sur. Drlg. L. 1,700 ft.

Harrison et al No. 1 Schuwerth, Jose Antonio De La Garza Sur. Drk.

Hikok & Reynolds No. 1 Elvert, Thomas York Sur. T.D. 1,670 ft.; 7-in. csg. 1,142 ft.; acdzg.

Joe H. Noake No. 1 Oppenheimer, W. Miller Sur. No. 180. 10-in. csg. 17 ft.

Chas. Persyn No. 1 fee, Wm. Lindsey Sur. S.D. 1,385 ft.

Caldwell County

D. L. Byrd No. 1 Parr, Jas. Hinds Sur., Abst. 125. S.D. 1,036 ft.

Mac-Wag-Tree Oil Co. No. 1 Roberts, W. House Sur. 5½-in. csg. 2,517 ft.; T.D. 2,713 ft.; swbd. well; flwd. sulfur wtr.; P.B. to test.

Cameron County

Saxet Prod. Co. No. 1 Port Isabel Irrig. Co. Sur. 30. Drk.

Dimmit County

Texas & Maryland Corp. No. 1 McKnight, Blk. 13, sec. 23. Base of Austin Chalk 5,201 ft.; top Georgetown L. 8,120 ft.; T.D. 7,116 ft.; S.D. for csg.

Duval County

Atlantic Ref. Co. No. 1 Frank Gravis, E. Gravis Sur., sec. 88. R.U.

Conroe Drlg. Co. No. 1 A. Trevino, J. Poitevent Sur., sec. 1. R.U.

Cown & Sorey No. 1 Taylor, J. Poitevent Sur. 214. T.D. 1,625 ft.; 7-in. csg. 1,644 ft.; bailing.

J. K. Culton No. 1 Sutherland, J. B. Duncan Sur. Drlg. sh. 1,542 ft.

Adolph Devore No. 1 E. R. Hagist, Sur. 265 ft.; T.D. 1,748 ft.; abd.

Frank Gravis No. 1 Megargal, J. Boyles Sur. R.U.

Magnolia Pet. Co. No. 1 Duval County Ranch Co., Sur. No. 195. 10¾-in. csg. 83 ft.; drlg. sh. 3,115 ft.

Magnolia Pet. Co. No. 1 W. K. Hoffman, sec. 111, S.A.&M.G. Sur. Drk.

Trinity Drillers No. 1 Peters, C.C.S.D. Sur. 66. Drlg. sh. 3,230 ft.

Edwards County

Dan Auld No. 1 Henderson, sec. 46, Blk. E. 7-in. csg. 1,865 ft.; S.D. 3,190 ft.

Goliad County

Windward Oil Co. No. 1 Dreier, B.S.&F. Sur. No. 7. 10-in. csg. 1,000 ft.; drlg. sh. 1,256 ft.

Guadalupe County

E. A. Hearn et al No. 1 Dudelof, Jas. D. Clements Sur. S.D. 720 ft.

Riddle Oil Co. No. 1 Weber, Guadalupe Torres Sur. Drlg. sh. 473 ft.

N. G. Spiller No. 1 Wright Highsmith. Drlg. sh. 1,200 ft.

Hidalgo County

Hidalgo Prod. Co. No. 1 Daskam Corp., Porc. 45, Blk. 34. Drlg. 150 ft.

Jim Hogg County

W. L. Stephens et al No. 1 Grey, Simon De Hinojosa Gr. 10-in. csg. 41 ft.; S.D. 3,500 ft.

Jim Wells County

H. H. Howell et al No. 1 Goldapp, Jose Maria Garcia Sur. T.D. 3,644 ft.; 5½-in. csg. 3,602 ft.; reperf. csg. 3,546-60 ft.; flwg. gas and wsh. wtr. through ¼-in. ck.; C.P. 600 lbs.

Magnolia Pet. Co. No. 8 Seeligson, A. Rameriz Sur. 13⅜-in. csg. 1,206 ft.; drlg. sh. 5,874 ft.

Homer Presnall et al No. 1 Banker Mortgage Co., Jose Maria Garcia Sur. R.U.

Rowan & Hope No. 1 Robert Adams, T.&N.O. Sur. No. 19. 13⅜-in. csg. 1,155 ft.; T.D. 5,512 ft.; P.B. 3,298 ft.; flwg. and est. 45 bbls. of fluid per day; 5/32-in. ck.; T.P. 185 lbs.; C.P. 295 lbs.; grav. 47.

Kornes County

Randon Oil Co. No. 1 Radford, M. T. Carlos Martinez Sur. T.D. 3,846 ft.; abd.

Kleberg County

Pure Oil Co. et al No. 1 State Ld., Tr. 68, Laguna Madre Bay, Lse. No. 838. Dredging canal.

Lee County

Jas. E. Pederson No. 1 Turner, David Hudson Sur. S.O.&G. 6,140-80 ft.; sdtrkd. at 4,600 ft. and drld. to 6,132 ft.; S.O.&G.; set csg. 6,021 ft.; acdzg. with 20-bbl. load; when opened well flwd. 20-bbl. head and went dead; swbd. oil and wtr.; acd.; pulling tbg. to rework and wtr.; acd.; S.D.

Eleoussa Oil Co. No. 1 Sanders, J. Vin Roeder Sur. T.D. 4,155 ft.; C.O.

Live Oak County

James Chew No. 1 Alma McNeil, Alexander Parks Sur. T.D. 5,076 ft.; 7-in. 5,076 ft.; balled dry; prep. to core ahead.

Louis Franklin No. 1 Russell, John Hefferman Sur. R.U.

Holland Oil Co. No. 2 Alamo Lbr. Co.,

Josefa Gemenez Sur. T.D. 1,665 ft.; abd.
Karotkin & Richardson No. 1 Pape, Wm. R. Conner Sur. R.U.
Ray L. Martin No. 1 Adams, J. Buchannan Sur. Drig. sh. 950 ft.
J. I. Newton No. 1 George West Est., Airy Pieratt Sur. No. 129. Drig. sh. 957 ft.
Parr & Delaney No. 1 Hogan & Stewart, A.B.&M. Sur. 45. Drig. sh. 3,761 ft.
J. P. Payzor No. 1 San Antonio Joint Stock, J. J. Roberts No. 1 Mahone. Fsg. 1,363 ft.
V. G. Schimmel et al No. 1 Geo. West, G. L. Haas Sur. S.D. 210 ft.

McMullen County

Duncan Drig. Co. No. 1 Martin Henry, sec. 6. S.D. 707 ft.
Thad-Day No. 1 Wulf, sec. 77. Drk.

Medina County

Ewing Oil Co. No. 1 Riff, Sur. 42. R.U.
J. R. Trentman et al No. 1 Carle Merv. Co., V. A. Johnson Sur. Drig. sh. 1,-300 ft.; sd.; S.O.&G. 1,210-12 ft.; no report.

Milam County

Texedo Oil Co. No. 1 Graham, Charles Cornea Sur. Logged S.O. 1,135-36 ft.; S.D. 1,142 ft.
Texedo Oil Co. No. 1 Paul Garves, C. Robertson Sur. S.D. 1,150 ft.

Nueces County

C. Andrade No. 1 John Dunn P Hinojosa Sur. No. 422. Cg. sh. 5,792 ft.
Corpus Christi Ref. Co. No. 1 J. R. Howington, O. and M. Oliver Sur. No. 156. 10¾-in. csg. 527 ft.
Renwar Oil Co. No. 1 Morgan, A.B.& M. Sur. 10¾-in. csg. 101 ft.; T.D. 5,844 ft.; recvd. 2,100 ft. S.W.; D.S.T. 5,828-44 ft.
Richardson Pet. Co. No. 2 H. B. Baldwin, E. Villareal Sur. No. 1. Drig. sh. 1,959 ft.
Rutherford Oil Corp. No. 1 L. A. Stewart, Denman Sur. Cg. sh. 7,087 ft.
Union Prod. Co. No. 1 Simmons, 1,000-ac. tr., Agua Dulce Gr. T.D. 8,706 ft.; P. B. 4,810 ft.; nerf. csg. 4,810-35 ft.; tstd. 67,000,0000 ft. wet gas per day, open tbg.

Refugio County

Barnsdall Oil Co. No. 1 C. H. Fagan, Nicholas Fagan. Spd.
Continental Oil Co. No. 1 Scott Hrs., Dona A. Reogas Sur. 10¾-in. csg. 1,-490 ft.; drig. sh. 5,712 ft.
Hogan Oil Co. No. 1 Kelley, M. & A. Roache Sur. T.D. 6,437 ft.; P.B. 6,002 ft.; perf. csg. 5,992-6,006 ft.; flwd. 150 bbls. fluid per day, 15% oil, balance S.W.; well died; R.U. to pmp.
Hogan Oil Co. No. 2 Kelly, J. Powers Sur. Drig. sh. 5,260 ft.; no report.

San Patricio County

A. L. Bob No. 2 Green, T. T. Williamson Sur. Cg. sdy. sh. 6,814 ft.
J. W. Cain et al No. 1 G. E. Guy, Geo. H. Paul Subd. T.D. 6,500 ft.; abd.
Conroe Drig. Co. No. 1 J. R. Daugherty Jas. McGloin Sur. T.D. 6,515 ft.; abd.
D. W. Moore No. 1 Kelly, J. H. Drummon Sur. Drig. sh. 5,570 ft.
Plymouth Oil Co. No. 1 Brigham, Geo. H. Paul Subd. T.D. 5,665 ft.; 7⅝-in. csg. cmtd. on bttm.; perf. csg. 5,661-64 ft.; flwg. 75% wsh. wtr., 25% oil.

Starr County

J. L. Collins No. 1 Francisco B. Guerra Santa Cruz Gr. T.D. 6,153 ft.; sd.; oil show; make D.S.T.
Sun Oil Co. No. 2-D Guerra, La Sacatosa Gr., 2 mi. SW of Cuevitas field. R.U.

Uvalde County

H. F. Wilcox O. & G. Co. No. 1 Morris, M. Carrello Sur. T.D. 3,090 ft.; may abd.

Victoria County

W. V. Bowles No. 2 Robertson, T. C. Burnham Sur. R.U.
Harry L. Edwards No. 1 Robertson, T. C. Burnham Sur. T.D. 5,624 ft.; P.B. 5,130 ft.; perf. csg. 5,118-22 ft.; flwg. wsh. wtr.; small amt. of oil.
Portilla Drig. Co. No. 1 P. H. Welder, S.A.&M.G. Sur. R.U.
Superior Oil Co. of Okla. and L. A. Gillespie No. 1 Mahon and Buhler, San Antonio Valley Ditch Sur., Abst. 368. 10-in. csg. 849 ft.; abd.

Webb County

Boysen & Jones No. 1 Watkins, San Casimero Gr. T.D. 4,092 ft.; (cor.).
Glicrease Oil Co. No. 1 Trofton, M. Lopez Sur. 282 ft. 10¾-in. csg. 46 ft.; T.D. 1,945 ft.; fsg.
W. S. Hill No. 1 Adami, A.B.&M. Sur. 345. Drk.

Willacy County

Magnolia Pet. Co. No. 1 Armendaiz, San Juan DeCarricitos Gr., Sh. 4. Drig. sdy. sh. 9,576 ft.
Salvieja Oil Corp. No. 2 Garcia Ld. Co. Blk. 118. Drig. sdy. sh. 5,010 ft.

Zapata County

Falcon Oil Co. 1½ Aquire, Sh. 28-A. R.U.
Killam & Radcliff No. 1 Rodriquez, Blk. 10, Sh. 12. T.D. 1,200 ft.; abd.

EAST TEXAS

(Border Counties)

Rodessa—Cass County

Bay Oil Co. No. 5 Cobb, G. Crowder Sur. Drig. sh.&L. 5,042 ft.
Bay Oil Co. No. 2 E. Parker, G. Crowder Sur. Drig. sh.&L. 4,364 ft.
G. H. Chamblee No. 1 White & Walker, R. Potter Sur. Drig. ch. rk. 2,400 ft.
Magnolia Pet. Co. No. 12 Rives, John Collum Sur. Drig. sh.&L. 5,516 ft.
Union Prod. Co. No. 5 Bangus Unit, Tromwell Sur. Set 7-in. csg. 5,994 ft.; T.D. 6,007 ft.; tstg.
G. H. Vaughn No. 1 Riley, J. Taylor Sur. Drig. anhy. 5,790 ft.

Bowie County

King Oil Co. No. 1 Ames, J. A. Tolbott Sur. D.&A. 4,480 ft.
King Oil Corp. No. 1 Watts, Geo. Brinlee Sur. Drig. 1,367 ft.

Harrison County

Ark.-La. Gas Co. No. 1 C. M. Abney, E. Little Sur. T.D. 4,820 ft.; set 7-in. csg. 2,440 ft.

Marion County—Rodessa

Arkansas-Louisiana Gas Co. No. 1 Hollands, Hanks Sur. Set 7-in. csg. 6,092 ft.; T.D. 6,121 ft.
Ark.-La. Gas Co. No. 3 Wade Houston, Coy Sur. T.D. 6,099 ft.; set 7-in. csg. 6,065 ft.; comp.; 469 B.P.D. on ¼-in. ck.
Ark.-La. Gas Co. No. 1 Howard, Thos. Gillespie Sur. Drig. sh.&L. 3,739 ft.
Ark.-La. Gas Co. No. 1 Pitts, C. Lockhart Sur. Set 16-in. csg. 209 ft.
Geo. Barham No. 1 Beard, R. Bennington Sur. Drig. 2,143 ft.
Dunn & Fisher No. 1 G. F. Whitfield, Bennington Sur. R.U.
Geo. Echols No. 1 Whitfield, R. Bennington Sur. Drig. L. 5,007 ft.
Flesh & Hootkins No. 1 Whitfield, Bennington Sur. Drig. sh.&L. 3,973 ft.
Gulf Oil Corp. No. 3-A Henderson, Bennington Sur. Drig. sh.&L. 4,841 ft.
Gulf Oil Corp. No. 1-A Ray, Hanks Sur. Drig. sh. 4,147 ft.
Heyser, Heard & Clardy No. 1 Brantley, Bennington Sur. R.U.
Heyser, Heard and Clardy No. 1-B Henderson, U. Ewing Sur. Set 7-in. 6,015 ft.; T.D. 6,050 ft.
Heyser, Heard & Clardy No. 2-B Henderson, Ewing Sur. R.U.
Hollandsworth Drig. Co. No. 2 Hill, Smith Sur. Drig. L.&sh. 4,319 ft.
Phillips Pet. Co. No. 1 Benefield, Hanks Sur. Drig. L. 3,220 ft.
Phillips Pet. Co. No. 1 Denton, Coy Sur. Drig. sh.&L. 4,767 ft.
Phillips Pet. Co. No. 1 Henderson, Gillespie Sur. Set 10¾-in. csg. 1,934 ft.; T.D. 1,938 ft.
Phillips Pet. Co. No. 1 Pruitt-Lockett, U. Ewing Sur. Set 7-in. csg. 6,157 ft.; T.D. 6,170 ft.
Shell Pet. Corp. No. 1 Whelan, Thos. Gillespie Sur. S.D.; high wtr. 2,364 ft.
Union Prod. Co. No. 6 Hutchinson, Coy Sur. Set 13⅜-in. csg. 251 ft.; W.O.C.

Panola County

Glassell et al No. 1 Pierce & Chesbro, Soaps Sur. O.W.W.O.; old T.D. 5,881 ft.; W.O.
H. E. Preston et al No. 1 Rushing Est., Manning Smith Sur. T.D. 3,028 ft.; M.I. rig.
Texas Co. No. 1 Claude Adams, T. Cox Sur. Drig. 4,847 ft.

WEST TEXAS WILDCATS

Andrews County

J. Donnelly et al No. 1 University, sec. 16, Blk. 14, University Sur. C.&P.
Rogers & Rogers No. 1 O. B. Holt, P.S.L. Sur. Tstg. 4,541 ft.
Seaboard Oil Corp. No. 1 Munger-Nix, sec. 1, Blk. A-4, P.S.L. Sur. Tstg. 4,-541 ft.
H. C. Wheeler No. 1 T. M. Gardner, sec 15, Blk. A-35, P.S.L. Sur. Drig. 1,300 ft.

Bailey County

Duffey & Etz No. 1 Enochs, Tract 66, League 182, Floyd Co. School Lands Sur. Fsg. bailer 4,160 ft.

Brewster County

F. C. Dodson No. 1 Texas American Synd sec. 66, Blk. 10, G.H.&S.A. Sur. Drig. 7,200 ft.
Storey No. 1 Wilson, sec. 3, Blk. 212. T.& St.L. Sur. S.D. 2,545 ft.

Cochran County

Devonian Oil Co. No. 1 Duggan, Oldham Co. Sch. Ld. Sur. Tstg. 5,044 ft.
J. R. Meeker et al No. 1 Wright, Mills City Sch. Ld. Drig. plug 4,930 ft.
Texas Co. No. 1 Mallett Ld. & Cattle Co., sec. 7, Blk. G, P.S.L. Sur. C.&P.
P. N. Wiggins et al No. 1 Dean, NE cor. League 58, Martin Co. School Lands. Running tub. 5,077 ft.

Coke County

Barnett Pet. Co. No. 1 J. R. Mims, sec. 39 Blk. W, T.&P. Sur. S.D.O. 1,680 ft.
H. E. Orden et al No. 1 Rawlins, sec. 390 Blk. B-21. Drig. 2,599 ft.

Concho County

Barnett Oil Dev. Co. No. 1 Sims, Abst. 851, Carl Thiele Sur. R.U.S.T. 162 ft.
Sam Murray No. 1 R. G. Armor, sec. 105, T.&N.O. Sur. S.D. 400 ft.

Cottle County

F. P. Hinds et al No. 1 Lee, 5 mi. SW of Paducah, A.B.&M. Sur. Cg. 4,385 ft.
Wilcox O. & G. Co. No. 1 Richards et al, sec. 761, Blk. Y, W.&G. Sur. S.D. 275 ft.

Culberson County

Grisham Hunter No. 1 Caldwell, sec. 14, Blk. 42, P.S.L. Sur. M.I.M.

Crockett County

Moore Bros. No. 1 Perner, sec. 37, Blk. 2, I.&G.N. Sur. Drig. 9,086 ft.
J. N. Simpson No. 1 Hoover, G.C.&S.F. Sur. Drig. bridge 1,931 ft.
Stewart & Cormas No. 1 Hoover, sec. 1, Blk. FF, B.B. Sur. Tstg. 1,931 ft.

Culberson County

Grisham & Hunter No. 1 fee, sec. 14, Blk. 42, P.S.L. Sur. M.I.S.T.

Dawson County

Albaugh No. 1 Robinson, E.L.R.R. Sur. T.D. 5,038 ft.; tstg.
Atlantic No. 1 Scanlan, sec. 83, Blk. M, E.L.R.R. Sur. P.B. from 4,965 ft. to 4,932 ft.; S.D. 4,932 ft

Dickens County

J. F. Morrisey et al No. 1 C. L. Bird, sec. 290, Blk. 1, H.&G.N. Sur. S.D.; W.O. 2,000 ft.

Ector County

Bodins et al No. 1 Edwards, Drig. 4,600 ft.
Wentz Oil Co. No. 1-B Parker. S.D.O. 4,802 ft.; C.O. 800 ft.; O.I.H.
L. H. Wentz Oil Co. No. 1-B Parker. C.O. 4,165 ft.
Melhoan Drig. Co. No. 1 Gulf Blakeney. Cg. 4,118 ft.

Edwards County

A. P. Carter No. 1 F. D. Sweeten, B.&B. Sur., 2 mi. E of Rock Springs. Drig. 6,301 ft.
Lyles & Dan Auld No. 1 Henderson, H.E. &W.T. Sur. S.D. 3,200 ft.
Richmond Drig. Co. No. 1 Brown, G.W. T.&P. Sur. S.D.O. 5,750 ft.

El Paso County

Tri-State Oil Co. No. 1 Kinkel. Fsg. 5,-571 ft.

Fisher County

Daniel & Rhodes No. 1 Nichless, Geo. W. Lawrence Sur. S.D. 3,340 ft.
General Crude Oil Co. No. 1 Morrow, sec. 185, Blk. 2, H.&T.C. Sur. Drig. 3,-537 ft.
Southern Oil Co. No. 1 Bocat, H.&T.C. Sur. S.D.O. 4,016 ft.

Floyd County

Mills Bennett No. 1 T. Montgomery, F. J Latham Sur., 6 mi. S of Floydada. T.D. 5,082 ft.; fsg.

Gaines County

Amerada Pet. Corp. No. 1 R. W. Robertson, sec. 196, Blk. G, W.T.R.R. Sur. Tstg. 5,112 ft.
Carter, Continental & Plymouth et al No. 1 Gelsecke. Drig. 5,724 ft.
Continental No. 1-45 Moore, sec. 45, Blk. AX, P.S.L. Sur. Drig. 1,850 ft.
Shell Pet. Corp. No. 1 M. B. Robinson, sec. 344, Blk. G, C.C.S.D.&R.G.N.G. Sur. Drig. 4,802 ft.

Garza County

Gulf Oil Corp. No. 1 Swanson, sec. 25, Blk. 2, H.&G.N. Sur. R.U.R.

Glasscock County

O. B. Greathouse No. 1 Burns, sec. 221, Blk. 29, W.&N.W. Sur. M.I.S.T.

Hockley County

Gulf Oil Corp. No. 1 M. G. Gordon, sec. 12, Blk. X, P.S.L. Sur. W.O.C. 4,757 ft.
Gulf Oil Corp. No. 1 Mallett Ld. & Cattle Co., sec. 6, Blk. X, P.S.L. Sur. W.O.C. 4,755 ft.
Honolulu Oil Co. No. 1-51 Dorthy Slaughter, Labor 51, League 37, Zavalla Co. Sch. Lds. W.O.C. 4,830 ft.
Honolulu Oil Co. No. 1-77, Labor 77, League 37, Zavalla Co. Sch. Lds. Loc.
Sid Richardson No. 1 Slaughter, Maverick Co. Sch. Lds. Tstg. 4,994 ft.
The Texas Co. No. 2 Slaughter, Labour 92, League 37, Zavalla Co. Sch. Lds. Drig. 4,965 ft.; S.O.

Howard County

Lockhart Oil Co. No. 1 Hussinger, sec. 67, Blk. 29, W.&N.W. Sur. Tstg. 2,925 ft.
W. F. McDermott et al No. 1 Lucas, sec. 18, Blk. 29, Twp. 1n, T.&P. Sur., 5 mi. N of Dodge pool. Drig. 3,077 ft.

Hudspeth County

Haymon Krupp Oil & Ld. Co. No. 1 Thaxton, SE¼ sec. 34, Blk. 74, Twp 6. T.D. 4,161 ft.; U.R. 3,815 ft.
Haymon Krupp No. 1 Briggs, sec. 24, Blk 73, Twp. 7, T.&P. Sur. T.D. 3,503 ft.; W.O. csg.

Jeff Davis County

Joiner Oil Corp. No. 1 Jones-Coffield. S.D. 3,500 ft.

Kent County

Thad A. Bryant Jr. No. 1 Haggins et al, sec. 118, Blk. 1, H.&G.N. Sur. Spudded and S.D.
Thad A. Bryant, Jr., No. 1 House, sec. 10, Blk. 1, H.&G.N. R.R. Sur., 6,000-ft. test. Drig. 200 ft.

Kerr County

A. E. Edmiston et al No. 1 J. H. Saul, sec. 47, T.W.N.G. Sur. Spdg.

Lamb County

Toddie L. Wynne, Tr. No. 1 Neuenschwander, Labour 1, League 660, State Cap't. Lds. Drig. 5,100 ft.

Loving County

Barnett Pet. Co. No. 1-A Johnson, sec. 2, Blk. 57, Twp. 1, T.&P. Sur. Drig. 3,-900 ft.
Bryant-Caraway et al No. 1 House, Pre-Emption Sch. Lds., sec. 10. Setting surface csg.
Carpenter & Grierson No. 1 Mrs. Bennie Barnes, sec. 22, Blk. C-25, P.S.L. Sur. Loc.

Lynn County

John L. Baldridge No. 1 Alma Lbr. Co., sec. 151, H.E.&W.T. Sur. S.D. 4,040 ft.

McCulloch County

Westbrook et al No. 1 Johnson, A. Nevendorf Sur. S.D. 1,836 ft.
Nixon No. 1 Pierce. S.D. 1,001 ft.

Martin County

Harris-Anderson Oil Corp. No. 1 Mollie Robinson, sec. 33, Blk. 38. T.&P. Sur S.D. 4,189 ft.

Menard County

G. A. Clements No. 1 Murchison, sec. 80 B.S.&S. Sur., 8 mi. E of Menard. Drig. 1,100 ft.
C. D. Haggerty No. 1 Callon, sec. 36, Jim Franz Sur. Spud. and S.D.

Pecos County

Harry Baker et al No. 1 White & Baker, sec. 53, Blk. 194, C.C.&S.F. M.I.M.
J. J. Dorr et al No. 2 Payton, sec. 99, Blk. 8, H.&G.N. Sur. Cellar and pits.
Ed Falney No. 1 Trees, sec. 63, Blk. 8, H.&G.N. Sur. Fsg. 2,055 ft.
Magnolia Pet. Co. No. 1 McKee. Running tbg. 5,330 ft.
Messenger & Osborn No. 1 Humble-Young, sec. 49, Blk. 10, H.&G.N. Sur. Acid, 1,807 ft.; pmpd. 35 B.O. 35 hrs.; S.D.O. 1,807 ft.
S. Thompson No. 1 Elsinore Cattle Co., sec. 54, Blk. D, G.C.&S.F. Sur. Drig. 7,120 ft.
Thompson & Minshall No. 1 Michaelson, 660 ft. N and W. sec. 24, Blk. 146, T.& St.L. Sur. S.D. 3,187 ft.
Trans-Pecos Oil Co. No. 1 Gallagher, T.&P. Sur. S.D. 1,610 ft.
Trans-Pecos Oil Co. No. 3-A Papham, G.H.&S.A. Sur. S.D. 1,934 ft.
Wilcox O. & G. Co. No. 1 Serf, sec. 27, Blk. 130, T.&St.L. Sur. Drig. 1,986 ft.

Presidio County

L. C. Brite No. 4 fee, C NW¼ sec. 113, Blk. 12, G.H.&S.A. Sur. U.R. 4,375 ft.

Reeves County

Barnett Pet. Corp. No. 1 Ely, sec. 38, Blk. 71, P.S.L. Sur., 12 mi. NW of Toyah. S.D. 4,223 ft.
Grisham Hunter Corp. & N. A. Grisham No. 1 Geo. Daniel, sec. 40, Blk. 58, T.&P. Sur. R.U.
Ohio Oil Co. No. 1 Papham, sec. 18, Blk. 54, T.&P. Sur. Drig. 1,150 ft.

Runnels County

E Z Oil Co. No. 1 B. Fletcher, E. C. Good Sur. T.D. 4,394 ft.; P.B. to 4,360 ft.; S.D. 4,384 ft.
Stevens & Glober No. 1 Fowler, sec. 150, E.I.R.R. Sur. R.U.

Schleicher County

J. M. Cooper No. 2 B. Page, sec. 40, Blk. L, G.H.&S.A. Sur. S.D. 5,004 ft.
Tex-Tor Oil Corp. No. 1 Judkins & Spencer, C of SW¼ sec. 33, Blk. A, A.&B. Sur. S.D. contract depth 6,043 ft.

Scurry County

Robinson Drig. Co. No. 1 Martin, sec. 147, H.&T.C. Sur. S.D. 3,513 ft.
T. G. Shaw Oil Co. No. 1 First Natl. Bank. Fsg. 2,420 ft.

Sterling County

J. W. Sward No. 1 Brennand, sec. 107, Blk. 2, H.&T.C. Sur. S.D.O. 250 ft.

Stonewall County

General Crude Oil Co. No. 1 J. D. Smith, sec. 371, Blk. 2, H.&T.C. Sur., 12 mi. N Rotan. Drig. 2,275 ft.
Swanson & Parriott No. 1 H. T. Carlisle, sec. 293, Blk. D, H.&T.C. Sur. Drig. 1,235 ft.

Sutton County

A. A. Basse and S. J. Sackett No. 1 W. A. Miers, sec. 54, Blk. 14, T.W.&N.G. Sur. S.D. 55 ft.
Ordovician Oil Co. No. 1 Evans, sec. 1, L. Stubblefield Sur., 32 mi. SE of Sonora. W.O.C. Drig. 4,125 ft.; topped Ellenburger 4,085 ft.

Terrell County

D. & S. Oil Co. No. 1 Sam Bell. Run. 10-in. csg. 549 ft.

Terry County

C. H. Hutto No. 1 Brownfield, E.L.R.R. Sur. S.D. 687 ft.

Tom Green County

Humble O. & R. Co. No. 1 Lewis & Wardlaw, sec. 5, Blk. 17, H.&T.C. Sur. Drig. 6,572 ft.
Southern Cross Oil Co. No. 1 J. W. Wilson, sec. 30, Blk. H, A.B.&M. Sur. Loc.
Spinner No. 1 Reed, Mason Ferry Ranch Sur. Run csg. 3,610 ft.; fighting cavings.

Upton County

Holland & Maverick No. 1 Faiff, sec. 6, Blk. H, C.C.S.D.&R.G.N.G. Sur. Drig. 350 ft.
W. D. Riser et al No. 1 King Ranch Oil & Lignite Co., sec. 8, Blk. 3, M.K.&T. Sur. Fsg. 730 ft.
Rutter et al No. 1 Egolb, sec. 5, J. H. Gibson Sur. Blg.; T.D. 3,294 ft.; S.D.O. 3,295 ft.
J. S. Pitman No. 1 D. Elder, C.C.S.D.& R.G.N.G. Sur., Blk. 3, sec. 14. Drig. 2,900 ft.

Ward County

Cities Service No. 2 Brandenburg, sec. 4, Blk. 32, H.&T.C. Sur. Tstg. 2,092 ft.
M. J. Delaney No. 1 J. E. Cooper, H.&T.C. Sur. Tstg. 2,092 ft.
J. E. Fitzpatrick et al No. 1 H. B. Carr, sec. 125, Blk. 34, H.&T.C. Sur. Drig. 790 ft.
J. E. Fitzpatrick et al No. 1 F. K. Dyer, sec. 135, Blk. 34, H.&T.C. Sur. Prep. drill deeper.

Hoss & Downey No. 1 Meyers, sec. 17, Blk. 32, H.&T.C. Sur. Spd. and S.D.

Hoss & Downey No. 1 Ross Avery, sec. 36, Blk. 1, H.&T.C. Sur. Drlg. 1,478 ft.

Patillo & Webster No. 1 Johnson. Drlg. 1,960 ft.

Sayre Oil Co. No. 1 Bertner, sec. 34, Blk. 1, H.&T.C. Sur. Drlg. 60 ft.

O. E. Schkode No. 1 Boogher, sec. 1, Blk. 32, H.&T.C. Sur. Drlg. 160 ft.

H. L. Wald No. 1 Brown Hrs., sec. 34, Blk. 1, H.&T.C. Sur. Tstg. 1,831 ft.

L. F. White et al No. 1 Rector-Monroe, E cor. sec. 3, Blk. 1, W.&N.W. Sur. S.D. 4,710 ft.

Yoakum County

Bahago & Bond Oil Corp. No. 1 J. L. West, sec. 607, Blk. D, J. H. Gibson Sur. Prep. shoot 5,318 ft.

Gulf No. 1 J. C. Futch, sec. 796, Blk. D. J. H. Gibson Sur. Drlg. 4,418 ft.

Humble No. 1 Abilene State Bank, sec. 37, Blk. AX, P.S.L. Sur. W.O.C. 4,755 ft.

Ohio No. 1 Claywater, sec. 638, Blk. D, J.H. Gibson Sur. R.U.R.

Shell No. 1-C Baumgart, sec. 866, Blk. D, J. H. Gibson Sur. Tstg. 5,018 ft.

Texas Co. No. 1 Walker, sec. 794, Blk. D. El. 3,656 ft.; T.D. 5,180 ft.; P.B. 5,162 ft.; S.D. 5,162 ft.

Stogner & Pipkin No. 1 Blade, J. H. Gibson Sur. S.D.O. 5,307 ft.

E. C. TEXAS WILDCATS

Angelina County

J. C. Bonham No. 1 Cameron Lbr. Co., E. Miller Sur., 3 mi. SE of Zavalla. Skidding drk.

Ger-Flo Oil Co. No. 1 J. L. Russell, J. Morin Sur., 3 mi. E of Dibol. P.B. 2,245 ft.

Ginter Co. No. 3 Copes Heirs, J. Morin Sur., 4 mi. E of Dibol. W.O.C. 2,200 ft.

C. E. Parrott No. 1 J. C. Burres, W. Plucker Sur., 2½ mi. W of Huntington. Drk.

Cherokee County

J. G. Mayo et al No. 1 J. H. Bowlery, W. H. Walters Sur. Drlg. 2,900 ft.

Merica Oil Co. No. 1 Cherokee Dev. Co., A. J. Acker Sur., 2 mi. E of Maydelle. Drlg. 5,022 ft.

Dallas County

Plaza Oil Co. No. 1 Davidson, Marchants Sur., 1 mi. NW of Seagoville. Spudded.

Falls County

McCleod et al No. 1 F. Bolton, J. R. Cockrill Sur., 4 mi. NW Rosebud. Fsg. 1,708 ft.

Franklin County

White-McGee & Harper No. 1 Harper, W. N. Dawson Sur., on Franklin-Hopkins Co. line, 6 mi. SW of Hagansport. R.U.

Freestone County

C. E. Rossiter No. 1 J. P. Fulton in J. P. Fulton Sur., 2½ mi. E of Donie. S.D. 956 ft.

Grayson County

Denver Prod. & Ref. Co. No. 1 E. B. Moore, E. Barnes Sur., ½ mi. NW of Whitesboro. Drlg. 622 ft.

Gregg County

Humble O. & R. Co. & Gulf O. Corp. No. 1 E. Robertson, M. Mann Sur., 2½ mi. SW of Longview Trinity test. El. 272 ft.; drlg. 3,721 ft.

Henderson County

Howard Pet. Co. No. 1 H. W. Barton, A. J. Allen Sur. S.D. 350 ft.

Jones-Mallory No. 1 A. Mallory, T. S. Mitchell Sur., 6 mi. SW of Mabank. M.I.M.

Hill County

J. Willis No. 1 W. P. Ball, S. Marshall Sur., 3 mi. NW of Covington. M.I.M.

Houston County

Peyton Bros. No. 1 J. N. Daniels, J. M. Procella Sur., ½ mi. N of Procella. S.D. 50 ft.

Lamar County

Cooper Bros. No. 2 L. B. Hayes, L. Roberts Sur. Loc.

Leon County

Lone Star Gas No. 1 Sarah Melasky, 1 mi. S of Buffalo pool. Reaming 6,579 ft.

Limestone County

C. L. Brown No. 27 N. B. Boyd, R. B. Longbotham Sur., 3 mi. S of Wortham T.D. 1,402 ft.; oil sd.; S.D.W.O. 1,455 ft.

J. S. Cosden, Jr. No. 1 J. J. Bower, J. Breeding Sur., near Prairie Hill. Drlg. 250 ft.

Stanolind O. & G. Co. No. 1 T. Norris, in Thresher Sur., 5 mi. N of Kosse; 6,500-ft. test; elev. 528 ft.; drlg. 3,861 ft.

McLennan County

Chapman & Kahn No. 1 Carl Hartsman, B. C. Walters Sur., 1½ mi. S of McGregor. Drlg. 810 ft.

Kilgore No. 1 J. M. Marrs, J. S. Rutland Sur., 2 mi. S of Bosque. S.D. 878 ft.

Navarro County

Natural Pet. Co. No. 1 Karen Brown, W. T. Turner Sur., 2 mi. E of Roane. Drlg. 1,510 ft.

Orchard & Biddle No. 1 Gibson, 6 mi. SW of Rural Shade, J. Bird Sur. Drlg. 3,850 ft.

Mrs. Jane Robinson No. 1 Fortson Bros., Eli Smith Sur., 5 mi. NE Corsicana. Drlg. 2,240 ft.

T. Sharpe et al No. 1 E. B. McDowell, T. Jordan Sur., 1½ mi. S of Bazeeta. S.D. 3,160 ft.

Smith County

Mayo-Housh & Thompson No. 1 J. B. Mayfield, Wm. Keys Sur., 4 mi. SE of Tyler. M.I.M.

Trinity County

Bilinoski et al No. 1 Trinity State Bnk., B. F. Wright Sur., 2 mi. S of Trinity. S.D. 120 ft.

Upshur County

Tom Hunter and American Liberty No. 1 J. P. Carter, J. H. Fields Sur. Drlg. 7,574 ft.

NORTH TEXAS WILDCATS

Archer County

A. H. Bedinghaus No. 1 J. L. Anderson, Blk. 23, S.A.R. Sur. 10-in. 80ft.; W.O.C.

Hull & Silk No. 1 L. F. Wilson, sec. 25, A.T.N.C.L. Sur. Drlg. 2,610 ft.

Wayne King et al No. 1 C. A. Arthur, sec. 3, G.H.&H. Sur. A-158. S.D. 210 ft.

Lewis Prod. Co. No. 1 W. C. Frey, sec. 17, P.P.S.L. Sur. Drlg. 3,865 ft.

Baylor County

D. S. Kelly No. 1 W. T. Waggoner, sec. 54, T.&N.O. Sur. S.D.O. 1,200 ft.

Clay County

Barnett Pet. Co. No. 1 Ben Nutter, sec. 30, Grayson Co. Sch. Lds. Drlg. 4,083 ft.

Deep Oil Dev. Co. No. 1 C. H. McClellan, Chas. F. Stanley Sur. A-407. Drk.

Wirt Franklin et al No. 1 Staggs, sec. 34, A.G.S.L. Sur. 12½-in. at 130 ft.; drlg. 2,504 ft.

Walter Gant No. 1 Bryant Edwards, S. C. Beldon Sur. A-12, 6,000-ft. test. Drk.

Healdton O. & G. Co. No. 1 Wallace, Belcher Subd. Drlg. 4,301 ft.

Wood Pet. & Roy. Corp. No. 1 I. H. Kempner, Blk. 44, Bosque Co. Sch. Ld. Sur. A-10. Cmt. 10-in. surf. csg.; W.O.C.

Cooke County

H. L. Nutting et al No. 1 H. P. Ware, A.C.C. Bailey Sur. A-44. Coring 2,216 ft.

Denton County

W. C. Curry et al No. 1 G. F. Owens, N. Rudder Sur. A-1,060. S.S.O. 1,570-80 ft.; S.D.O.

Foard County

Texas Co. No. 16 Johnson, sec. 37, S.P. R.R. Sur. Loc.

Jack County

Auers et al No. 1 Garrison, W.C.R.R. Sur. A-960. 7-in. 2,830 ft. by Schlumberger; T.D. 3,140 ft.

G. M. Gillespie No. 1 A. M. Street, sec. 3339, T.E.&L. Sur. U.R. 8¼-in. 2,215 ft.; fsg. 2,400 ft.

Jones & Conklin No. 1 R. A. Heffner, H.&G.N. Sur. A-296. Drk.

O. J. Perrin No. 1 J. S. Rhodes, J. W. Coates Sur. A-1240. 6⅝-in. 3,125 ft.; drlg. plug.

Van Eman & Richards No. 1 Whitsell, Wm. McElroy Sur. A-599. Fsg. 3,235 ft.

Montague County

H. H. Powell No. 1 Arch Durham, W. J. Wagoner Sur. A-936. S.D. 411 ft., weather.

J. W. Sorrell et al No. 1 J. E. Walthall, Sam. H. Smith Sur. A-662. S.D.O. 2,720 ft.

Wichita County

Bolin & Whittington No. 1 Waggoner Bros., sec. 21, H.&T.C. Sur. Drlg. 1,600 ft.

King & Fabor No. 1 J. N. George, J. Waldschmidt Sur. A-571. S.D.O. 3,394 ft.

Tom Medders No. 1 E. Fields, sec. 32, H.&G.N. Sur. Drlg. 3,182 ft.

F. W. Merrick, Inc., No. 1 W. T. Waggoner, sec. 35, H.&T.C. Sur., Blk. 5. Top Ellenburger 3,745 ft.; L. 3,745-67 ft.; will test.

E. T. Noble No. 1 K. P. Abernathy, sec. 9, T.C.S.L. Sur. A-282. Drlg. 2,610 ft.

Rathke Oil Co. No. 1 S. B. Burnett "Gulf," sec. 4, H.T.&B. Sur. A-752. 7-in. csg. 3,550 ft.; S.L. 3,552-3,692 ft.; shot 225 qts.; 2,000 ft. O.I.H; C.O. and tstg.

E. J. Stump No. 1 M. P. Bishop, L. Netherly Sur. A-240. S.D.O.; S.L. 3,885-3,997 ft.

Wilbarger County

Barry & Hayes No. 1 McGill, sec. 3, Blk 9, H.&T.C. Sur. U.R. 7-in. 3,300 ft.; T.D. 3,750 ft.

Loyd H. Brown No. 1 W. T. Waggoner sec. 33, Blk. 6, H.&T.C. Sur. 7-in. 4,075 ft.; W.O.C.

E. C. Lawson No. 1 Ruitsch, sec. 21, H. & T.C. Sur., Blk. 9.—S.D. 70 ft., weather.

T. L. Moore Drlg. Co. No. 1 Mrs. G. E. Blackman, sec. 30, Blk 3, H.&T.C. Sur. Spd.

Phillips Pet. Co. No. 1 W. T. Waggoner "Barger," sec. 11, H.&T.C. Sur., Blk. 14. 7-in. 2,850 ft; L.S.O. 2,850-60 ft.; testing.

B. R. Rainwater No. 1 J. A. Turkett, Blk. 8, W.C. Sur. Cmt. surf. pipe.

Young County

Anzac Oil Corp. No. 1 E. S. Graham, A. Hines Sur. A-135. T.D. 4,000 ft.; tstg. L. 3,990-98 ft.

N. B. Crenshaw No. 1 J. C. Dwight, sec. 1,444, T.E.&L. Sur. S.D. 400 ft.

Howard Pet. Co. No. 1 G. R. Stewart, sec. 84, C.S.L. Sur. Drlg. 3,080 ft.

Kadane-Griffith No. 1 Sanders, sec. 1989, T.E.&L. Sur. Drlg. 2,550 ft.

RANGER (CENTRAL TEXAS) DISTRICT

Callahan County

R. F. Gilman et al No. 1 W. A. Young, 5 mi. NW Clyde, sec. 37, B.B.B.&C. Sur. T.D. 2,100 ft.

J. H. Howell No. 1 E. I. Vestal, 1,149 ft. E line, 1,000 ft. N line, Jesse Dyson Sur., 2 mi. NE Cross Plains, rotary to 4,000 ft. Surf. to 100 ft.; S.D. at 150 ft.

Hal Hughes No. 1 Poindexter, sec. 350, Geo. Hancock Sur., 2 mi. NE of Oplin. Set 7-in. 3,870 ft.; est. 1,000,000 ft. gas lime 4,368-89 ft., T.D., S.L.M.; est. 300 B.O.P.D.; 5-in. set 4,358 ft.; acid. 3,000 gal.; flowing est. 1,000 B.O.P.D. with 5,000,000 ft. gas; waiting on tanks.

J. C. Jackson et al No. 1 Thompson, 2 mi S. Eula, sec. 30, B.B.B.&C. Sur. S.D. 1,955 ft.

Wittmer Oil & Gas Properties, Inc., No. 1 R. D. Williams et al, 300 ft. from N line, 467 ft. from W line sec. 2,269, T.E.&L. Sur., 2 mi. NE Putnam. 4,500-ft. test.

Coleman County

J. F. Brock No. 1 J. H. Livingston, SE cor. SW¼ county. J. D. Waters Sur. No. 208. Drlg. 1,150 ft.

Comanche County

N. D. Gallagher et al No. 1 Mrs. B. I. Terry, Desdemona pool, N. H. Kuykendall Sur. S.O. in Ellenburger; drying hole at 4,720 ft.

Dobbs Oil Co. No. 1 Hodges, sec. 11, Blk. 2, H.&T.C. Sur., T.D. 2,710 ft:; acid. 4,000 gal. 2,630-62 ft.; flowing 25 bbls. hourly thru ¼-in. ck.; tstg.

Eastland County

G. D. Chastain et al No. 1 Weddington, 4 mi. N. Cisco, sec. 496, S.P.R.R. Sur. T.D. 4,079 ft.; plugging back.

Hickok Prod. & Dev. Co. No. 1 J. E. Donovan, 5 mi. NW of Cisco, 660 ft. from N and E lines of NW¼ sec. 489, S.P. R.R. Sur. Top Ellenburger 4,247 ft.; trt. 1,000 gal. and 10,000 gal. acid; no results; drlg. past 4,310 ft.

J. D. Kittrell No. 1 Reynolds, 5 mi. E of Carbon, sec. 23, H.&T.C. Sur., Blk. 1, S.D. 988 ft.

Lone Star Gas Co. No. 1 M. Thomas, 5 mi. NW of Cisco, 668 ft. from N line and 660 ft. from E line of SE¼ sec. 478, S.P.R.R. Sur. Drlg. 3,300 ft.

Fisher County

Owens-Snebold & A. C. Varner No. 1 J. H. Milsap, 3,500-ft. wildcat, 2 mi. NW McCaulley, 330 SL 330 WL, sec. 61-2, H.&T.B. Sur. Drlg. 476 ft.

Haskell County

Fain-McGaha Oil Corp. No. 1 T. G. Hendrick, C W½ sec. 104, Indianola Ry. Sur. Set 150 ft. of 12½-in.; drlg. 500 ft.

Superior Oil Corp. No. 1 T. G. Hendrick, 330 ft. S line, 330 ft. E line, N½ sec. 9, A. Rodriguez Sur., rotary to 3,500 ft. Drlg. waiting on drill pipe at 3,100 ft.

Jones County

J. S. Bridwell No. 1 C. L. Carter, 220 ft. from N and E lines SW SE section 37-15, T.&P. Sur. Drlg. 750 ft.

Jack Burleson No. 1 T. J. Lotspeich, 220 ft. from S and E lines of sec. 40-15, T.&P. Sur. U.R. 6-in. to 2,146 ft.

Danciger No. 1 Hugh E. Roberts, 220 ft. from S and W lines, E 110-ac., NE¼ sec. 37-15, T.&P. Sur. Drlg. 1,635 ft.

F. A. Gillespie & Sons No. 1 J. N. Hatfield, 3 mi. N Noodle Creek field, 330 from N and E lines, 80-ac. tr. in M. Northington Sur. No. 270. Drlg. 2,123 ft.

Mack Hayes and Montour Oil Co. No. 1 Chittenden, 7 mi. SE Hamlin, Subd. 18, McMullen & McGloin Sur. 337. Drlg. 2,750 ft.

Humble No. 1 I. N. Irwin, 330 ft. from S and W lines sec. 48-18, T.&P. Sur., 1½ mi. E Noodle Creek pool. Rotary to 3,200 ft.

Iron Mountain No. 1 D. J. Herbst, 5 mi. E Hamlin, 330 ft. from N and E Sub. 18. Austin Williams Sur. 339. Fsg. 1,100 ft.

Walter K. Jones No. 1 D. M. Neas, 506 ft. from E and 1,113 ft. from S of Neas 75 ac., D. Bustillos Sur. 189. Set 49 ft. 12½ in.; S.S.O. and 50,000 ft. gas 1,953-60 ft.; set 6-in. to 1,958 ft.; acid. 3,000 gal.; testing; est. 500 bbls. per day.

F. M. Loop No. 1 W. T. Young, 330 ft. from N line, 253 ft. from E. L. Young 276 ac., D. Bustillos Sur. 189.

F. W. Martin No. 1 B. N. Herndon, 330 ft. from S and W of NW sec. 1, M.E.&P. Sur. Fsg. collapsed csg. 1,750 ft.

F. W. Merrick et al No. 1 C. A. Cox, cent. Cox 119-ac. tr., J. H. Hughes Sur No. 201. Rig.

Owens-Snebold No. 1 Alice Rhodes, 4 mi. W of Nugent, 330 ft. from N and W lines of NW¼ sec. 31, T.&P. Sur., Blk. 15. Lost hole 950 ft.; skd. 20 ft. E; U.R. S.S.O. 1,980-90 ft.; R.B.S.O. 2,227-45 ft.; drlg. 3,100 ft.

B. H. Roth No. 1 D. A. Kinney, 4,000-ft. test, 330 ft. from S and E of NW sec. 7-4, H.&T.C. Sur. at 1,830 ft.; collapsed pipe.

Stanton & Miller No. 1 Gaither, 4½ mi. N of Anson, sec. 38, B.B.B.&C. Sur. S.D. 2,180 ft.

Joe A. Worsham et al No. 1 J. H. Commons, 330 ft. from S and E lines, Steffens Subdiv., Lot 7, A. W. Hill Sur. No. 4. Set 12½-in. at 1,020 ft.; fsg. 1,500 ft.

Nolan County

Hantho-Nelson, Inc., No. 1 J. H. Withers, C SW¼ sec. 65-21, T.&P. Sur. Wildcat to drill 4,000 ft. Spd.

Palo Pinto County

Brazos River Gas Co. No. 5 M. B. Costello B, 1½ mi. N Pickwick, 1,397 ft. from N line and 150 ft. from W line of survey (W line being river bank), 660 ft. SW No. 4, R. R. Williams Sur. Drlg. 2,860 ft.

W. H. Clement No. 1 Federal Life Ins. Co., 2 mi. W Mineral Wells, sec. 51, T.&P. Sur., Blk. A (E of B). Drlg. 1,510 ft.

Bill Cole et al No. 1 J. W. Harris Est., NW cor. county, De La Garza Sur. S.D. 950 ft.

King Oil Co. No. 1 S. F. Lee, 4 mi. NW Graford, 933 ft. from N and W lines of sec. 1,744, T.E.&L. Sur. T.D. 4,363 ft., contract depth.

Ernest Lloyd et al No. 1 McClure, 3 mi. NE Graford, sec. 2,004, T.E.&L. Sur. S.D. 1,200 for csg.

Shackelford County

Danciger No. 2 J. E. McCown, 330 ft. from S and E sec. 158, B.B.B.&C. Sur., N offset to Haterius. U.R. 8-in. to 1,907 ft.; S.S. gas.

Joe DeGrazier No. 1 Harbough, E cen. part of county, sec. 1,563, T.E.&L. Sur. 4,500-ft. test; drlg. 1,100 ft.

Forest Dev. Corp. No. 1 T. G. Hendrick, NW cor. of county, 2,600 ft. from N line and 4,300 ft. from W line of sec. 1, A.B.&M. Sur. Est. 15,000,000 ft. gas per day 1,603-17 ft.; gas 1,662-65 ft., incr. est. 4,000,000 ft., 1,680-85 ft.; est. 1,000,000 ft. 1,804-06 ft. and 1,810-15 ft.; S.S. oil and wtr. 1,864 ft.; inc. wtr. 1,880-82 ft.; fsg. U.R. lugs 2,032 ft., T.D.

Hugh King, Jr., et al No. 2 Davis-Walker, sec. 55-13, T.&P. Sur. S.S.O. 3,427-32 ft.; drlg. 3,925 ft.; carrying 2 B.W.

Iron Mountain Oil Co. No. 1 E. O. Beck, NW cor. county, 300 ft. from S line and 299 ft. from W line of sec. 162, B.B.B. &C. Sur. Est. 100 bbls. oil per day: 1,905-33 ft., T.D.; ran 6-in.; acid. 1,000 gal.; testing est. 100 B.O.P.D.

R. C. Parker No. 1 J. Smalley, NW cor. of NE¼ county, 1,245 ft. from N line and 1,260 ft. from E line of sec. 11, E.T.R.R. Sur. Spd.

Ungren & Frazier No. 1 J. S. McKeever, 306 ft. from W line, 354 ft. from N line, NW¼ SW ¼ sec. 14-3, H.&T.C. Sur. 3,500-ft. test; M.I.M.

Stephens County

Danciger Oil Ref. Co. No. 1 Mrs. Aileen Copeland, 8 mi. SE Ivan, 1,196 ft. from E line and 350 ft. from S line of sec. 1, M.E.P.&P. Sur. U.R. 2,755 ft.

Graham, Hafner, Lane & Inman No. 1 J. N. Yocum, 5 mi. SE of Frankell, 250 ft. from N and E lines of farm or approx. 2,525 ft. from E line and 1,400 ft. from S line of John R. Carter Sur. Trt. 1,000 gal acid 3,575-90 ft.; est. 25-50 bbls. per day.

I. C. Little No. 1 R. M. Rogers, NE¼ of county, 150 ft. from E line and 1,980 ft. from S line of sec. 28, T.&P. Sur., Blk. 5. Tstg. after 10,000-gal. acid 3,960-4,055 ft., T.D.; with 3,000,000 ft. gas.

G. Willard Rich No. 1 J. W. Andrews, 5½ mi. E Moran, 330 ft. from W line, 450 ft. from S line, NW¼ sec. 39-7, T.&P. Sur. 4,250-ft. test.; loc.

Stonewall County

General Crude Oil Co. No. 1 J. D. Smith, SW cor. county, 330 ft. from S and E lines of sec. 371, H.&T.C. Sur., Blk. 2. Set 12½-in. at 2,079 ft.; drlg. 2,120 ft.

F. B. Parriott No. 1 H. T. Carlile, 330 ft. from S line, 990 ft. from E line, SW¼ NE¼ sec. 293, Blk. D, H.&T.C. Sur., rotary to 5,500 ft., 6 mi. NW of Swenson. Drlg. 825 ft.

Taylor County

A. Findley No. 1 Bowles Est., NE cor. county, sec. 26, B.A.L. Sur. Tstg. 1,873-80 ft.

Throckmorton County

Humble O. & R. Co. No. 1-A Reynolds Cattle Co., 330 ft. from S and E lines, sec. 7-2, A.B.&M. Sur. H.F.W. 2,525-30 ft.; 2,572 ft.; fsg. collapsed 8-in.

Canadian Fields

(Continued from Page 106)

horizon with around 6,000,000 feet per day. Aloka Oil & Gas Co. No. 2, Brown farm, Lot 26, Concession 12, finished below 930 feet with 4,000,000 feet per day. Adams, McCutcheon & Aiken No. 1 Brown, Lot 27, Concession 12, finished below 925 feet, starting with about 1,000,000 feet per day. Central Pipe Line Co. No. 2, Thomas R. Farrow farm, Lot 26, Concession 11, finished at 938 feet made 2,000,000 feet a day, open flow. Reed & Adams No. 3, T. M. Moore farm, finished below 935 feet, was good for 3,800,000 feet a day.

In the Eden field, Elgin County, Eden Gas Co. No. 7, Wilson farm, Bayham Township, total depth, 1,365 feet, was a 230,000-foot gasser from Clinton sand. Eden No. 8 has been started in S half of the same lot.

Program for A.A.P.G. Meeting March 14-18 at New Orleans

(Continued from Page 39)

La.): North-South Geologic Cross Section Through Southwestern Arkansas and Western Louisiana.

65. B. W. Blanpied (Gulf Refining Co., Shreveport, La.): The Age and Correlation of the Salt Mountain Limestone, Clark County, Alabama.

66. Arthur C. Munyan (Division of Mines, Mining and Geology, Atlanta, Ga.): Recent Petroleum Activities in the Coastal Plain of South Georgia.

67. Olive C. Postley (U. S. Geological Survey, Washington, D. C.): Oil and Gas Possibilities of the Atlantic Coastal Plain from New Jersey to Florida.

68. Harvey Whitaker (Bridwell Oil Co., San Antonio, Tex.): Hoffman Field, Duval County, Texas.

69. C. L. Moody (Ohio Oil Co., Shreveport, La.): Earlier Mesozoic History of the Northern Gulf Region.

70. Stanley C. Herold (Shell Petroleum Co., Los Angeles, Calif.): Criteria for the Determination of the Time of Accumulation Under Special Circumstances.

71. W. Baxter Boyd (Continental Oil Co., Ponca City, Okla.): The Jesse Pool, Pontotoc and Coal Counties, Oklahoma.

72. Allen W. Tillotson (Geologist, Tulsa): The Olympic Pool, Hughes and Okfuskee Counties, Oklahoma.

73. T. C. Heistand (Indian Territory Illuminating Oil Co., Bartlesville, Okla.): Studies in Insoluble Residues from the "Mississippi Lime" of Central Kansas.

74. R. L. Denham (Humble Oil & Refining Co., Midland, Tex.): Means Field, Andrews County, Texas.

75. Glen G. Bartle (University of Kansas City, Mo.): The Cherokee Formation Near Kansas City.

76. Samuel G. Lasky (U. S. Geological Survey, Washington, D. C.): A Newly Discovered Section of Trinity Age in Southwestern New Mexico.

77. C. Lathrop Herold (Shell Petroleum Corp., Tyler, Tex.): Geology of the Salinas and Jamesburg Quadrangles, Monterey, California.

78. B. W. Blanpied and R. T. Hazzard (Gulf Refining Co., Shreveport, La.): Structure and Stratigraphy of the Hatchetigbee Anticline and Jackson Fault Areas, Alabama.

79. W. Armstrong Price (Geologist, Corpus Christi, Tex.): Tentative Correlation of Gulf Coast and Mississippi Valley Pleistocene Deposits.

80. W. Armstrong Price (Geologist, Corpus Christi, Tex.): Geology of Rio Grande Delta, Texas and Mexico, Interpreted by Geomorphology and Soils.

81. Arthur G. Hutchinson (United British Oilfields of Trinidad, Ltd., Point Fortin, Trinidad, B. W. I.): Upper Eocene Unconformity of Trinidad.

82. Frederic A. Bush (Sinclair Prairie Oil Co., Tulsa): Geology of the Moore Field, Cleveland County, Oklahoma.

83. Warren B. Weeks and C. W. Alexander (Phillips Petroleum Co., El Dorado, Ark.): The Shuler Field, Union County, Arkansas.

84. R. G. Reese (Standard Oil Co. of California, Los Angeles, Calif.): El Segundo Oil Field, California.

85. M. Kamen Kaye (Caracas Petroleum Co., Caracas, Venezuela, S. A.): Review of Problems in the Geological Succession of Central Venezuela.

86. Gordon Atwater (Skelly Oil Co., Houston, Tex.): Isopach Contouring of Faulted Formations.

87. Rollin Eckis (Richfield Oil Corp., Bakersfield, Calif.): Significance of Stratigraphic Distribution of Recent Oil and Gas Discoveries, in the San Joaquin Valley of California.

88. Lon B. Turk (Oklahoma City, Okla.): A study of Minor Folds: Their Relation to Production and the Major Structures.

89. H. M. Horton (Superior Oil Co., Houston, Tex.): Bosco Oil Field, Acadia and St. Landry Parishes, Louisiana Gulf Coast.

90. J. Brian Eby (Houston, Tex.): Relation of Geological and Geophysical Exploration to Petroleum Discoveries and Reserves, by Permission U. S. Bureau of Mines.

91. Claude C. Albritton, Jr., (Southern Methodist University, Dallas, Tex.), Summary of Results of a Geological Survey in the Malone Mountains, Hudspeth County, Texas.

92. Alexander Deussen and Kenneth Dale Owen, (Houston, Tex.), Correlation of Surface and Subsurface Formations in Two Typical Sections of the Gulf Coast.

93. J. Elmer Thomas, (Houston, Tex.), Soviet Method of Estimating Oil Reserves.

Society of Exploration Geophysicists

Program of annual meeting of the Society of Exploration Geophysicists at New Orleans, March 15-17, 1938. Headquarters: Roosevelt Hotel.

Tuesday, March 15

8:00 a.m. Meeting of nominating and executive committees.
9:00 a.m. Registration.
10:00 a.m. Technical session, University Room.
12:15 p.m. Luncheon, Blue Room.
2:00 p.m. Technical session, University Room.
8:00 p.m. Banquet, Grand Ball Room.

Wednesday, March 16

10:00 a.m. Technical session, University Room.
2:00 p.m. Technical session, University Room.

Thursday, March 17

9:00 a.m. Joint meeting with A.A.P.G., at which two papers from society's program will be presented by special request, as being of like interest to both organizations.

Partial List of Papers

Beers, Roland F., Geotechnical Corp., Dallas, Tex., "A Problem in Seismic Depth Calculation."

Cloud, Raymond T., Western Geophysical Co., Los Angeles, Calif., "The Energy and Amplitude of Reflected Seismic Waves."

Deussen, Alexander, consulting geologist, Houston, Tex., "Discoveries." (Joint meeting, March 17.)

Eckhardt, E. A., Gulf Research & Development Corp., Pittsburgh, Pa., "Gravity Difference Benchmarks for Gravimeter Calibration and Control Thereof."

Evjen, H. M., Shell Petroleum Corp., Houston, Tex., "Depth Factors and Resolving Power of Electrical Measurements."

Green, Cecil H., with T. N. Walsh and Barney Fisher, Geophysical Service, Inc., Dallas, Tex., "Velocity-Depth Determinations from Velocity Profiles."

Hawley, Paul F., Western Geophysical Co., Los Angeles, Calif., "Transients in Electrical Prospecting."

Johnson, Curtis H., Rieber Laboratory, Los Angeles, Calif., "Steady State Polar Sensitivity Curves."

Karcher, J. C., Geophysical Service, Inc., Dallas, Tex., "Review of the Relation Between Physics and Geology." (Joint meeting, March 17.)

Kelly, Dunford, Western Geophysical Co., Los Angeles, Calif., "A Reaction Type Steady State Shaking Table."

Klaus, H., Klaus Exploration Co., Enid, Okla., "An Introduction to the Second Derivative Contour Method of Interpreting Torsion Balance Data."

Lawlor, Reed, Rieber Laboratory, Los Angeles, Calif., "Chart for Dip Computations."

McGhee, George C., National Geophysical Co., Dallas, Tex., "A Seismic Survey in the South of England."

Mott-Smith, Morton, Independent Exploration Co., Houston, Tex., "On Seismic Paths and Velocity-Time Relations."

Murray, G. H., with M. Martin and W. J. Gillingham; Schlumberger Well Surveying Corp., Houston, Tex., "Determination of Potential Productivity of Oil-Bearing Formations by Resistivity Measurements."

Mitera, Z. A., consulting geophysicist, Lwow, Poland, "Present Status and Future Aspect of Geophysical Prospecting in Poland."

Muskat, Morris, Gulf Research & Development Corp., Pittsburgh, Pa., "The Reflection of Longitudinal Wave Pulses from Plane Parallel Plates."

Rock, S. M., Rieber Laboratory, Los Angeles, Calif., "Three Dimensional Reflection Control."

Rosaire, E. E., Subterrex, Houston, Tex., "Shallow Stratigraphic Variations Over Gulf Coast Structures."

Silverman, Daniel, Western Geophysical Co., Los Angeles, Calif., "The Steady State Response of Electro-Magnetically-Damped Dynamic and Reluctance Type Seismometers."

Sparks, Neil R., and Paul F. Hawley, Western Geophysical Co., Los Angeles, Calif., "Maximum Electromagnetic Damping of a Reluctance Seismometer."

West, S. S., Subterrex, Houston, Tex., "Electrical Prospecting With Nonsinusoidal Alternating Currents."

C. V. Terrell, chairman of the Texas Railroad Commission, has announced his candidacy for re-election to the commission.

Louisiana-Arkansas Fields

(Continued from Page 103)

580 bbls. per day of distillate on a seven-sixteenths inch choke with tubing pressure of 2,600 pounds and casing pressure of 2,950 pounds. The well also made an estimated 7,000,000 feet of gas. Seven-inch casing was set at 8,295 feet and bottom of the hole is 8,325 feet.

North American Oil Co. No. 1 Coyle, section 28-21-10, made an initial production of 25 bbls. per hour of distillate through a half-inch choke with an estimated 6,000,000 feet per day of gas. Seven-inch casing was set at 8,296 feet and total depth is 8,333 feet. Casing pressure on the test was 2,700 pounds and tubing pressure, 2,500 pounds.

Ohio Oil Co. No. 2 Bodcaw, section 24-21-10, made 409 bbls. per day of distillate with an estimated 5,000,000 feet of gas through a three-eighths inch choke, with tubing and casing pressure at 2,500 pounds.

The North American Oil Co. No. 1 Stewart, which last week was swabbing 100 bbls. of oil from the shallow Holloway sand, is being drilled deeper to the Bodcaw, and is below 6,500 feet.

Morehouse Wildcat

Considerable interest is being shown in W. J. Furlong No. 1 E. M. Clark, a wildcat in the Mer Rouge area of central Morehouse Parish, east of the Munroe gas field. The test was recently shut down at the original contract depth, after which, with aid of four interested major oil companies, casing was set and the test drilled deeper to the Big lime, which was cored. Top was 6,207 feet. While no showings have been reported, the test is considered to have good possibilities due to the fact that it is running much higher than any yet drilled in the district. At latest report operators were coring at 6,351 feet in hard and soft sand streaks.

In Union Parish, near the town of Farmersville, the Standard Oil Co. of Louisiana has taken over the former Modesett No. 1 Frost Lumber Co. The hole was reamed down, and operators are coring hard shale and lime at 7,111 feet.

Estimated Daily Production

Estimated daily gross production all companies week ending February 27:

NORTH LOUISIANA

	Bbls.
Bellevue	700
Caddo light	3,850
Caddo heavy	2,500
Converse	640
Cotton Valley heavy	180
Cotton Valley light	*5,400
De Soto and Red River	1,420
Elm Grove	335
Haynesville	3,040
Holly	85
Homer	2,510
Lisbon	10,620
Pleasant Hill	115
Rodessa	43,335
Sarepta-Carterville	300
Sligo	550
Sugar Creek	320
Urania	2,885
Zwolle	770
Total	79,555

SOUTH ARKANSAS

Buckner	445
Champagnolle	1,175
El Dorado	1,845
Lisbon	280
Miller County	400
Nevada	675
Rodessa	7,685
Schuler	13,340
Smackover light	1,975
Smackover heavy	15,900
Stephens	560
Troy	1,320
Urbana	1,200
Total	46,800

Texas side of Rodessa field, 29,860 bbls. daily.
*3,900 bbls. is distillate.

Secretary Ickes Approves Helium Property Purchase

WASHINGTON, D. C.—Secretary Ickes has approved the purchase by the federal government of all the helium properties of the Girdler Corp. of Louisville, Ky., at Dexter, Kans., and Thatcher, Colo. The price is $537,975. Coincident with the purchase Mr. Ickes announced that sales of helium by the Bureau of Mines for medical, scientific and commercial use will begin in the near future.

Market Record of Active Oil Stocks

Compiled by Carl H. Pforzheimer & Co., 25 Broad Street, New York City, Member New York Stock Exchange and New York Curb Exchange

New York Stock Exchange

1938 High	1938 Low	Week ending Feb. 26 Sales	Week ending Feb. 26 High	Week ending Feb. 26 Low	Week ending Feb. 26 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1936	1937 High	1937 Low	1936 High	1936 Low
72½	57	3,600	72½	70	70½	Amerada Corp.	788,675	N.P.	50cQ	3-31-38	$2.00	114⅞	51½	125½	75
23¾	20	5,500	23¾	23	23½	Atlantic Refining	2,664,000	$25	25cQ	3-15-38	1.25	37	18	35⅛	26⅝
19	14⅛	8,500	19	17¼	18¼	Barber Co.	387,149	$10	75c	12-16-37	.50	43⅜	10⅛	38½	21
16⅜	13	16,300	16⅜	15¼	15¾	Barnsdall Oil Co.	2,247,974	$5	25cQ	2-1-38	.80	35¼	10	28¼	14⅛
10½	8½	13,200	10	9⅜	9¾	Consolidated Oil Corp.	13,919,417	N.P.	20cQ	2-15-38	.80	17⅞	7	17¼	11½
34⅜	27½	10,200	33⅛	30¼	38¾	Continental Oil of Delaware	4,682,615	$5	25cQ	3-31-38	1.50	49	24	44⅞	28⅛
8⅞	6¼	23,100	8⅞	8	8⅜	Houston Oil (new)	1,098,618	$25	....	10-17-30	....	17⅝	4¾	13⅞	6⅜
22⅝	17⅛	3,200	20¼	18¾	19½	Mid-Continent Petroleum	1,855,912	$10	$1	11-1-37	1.15	35⅜	14	30⅞	17¼
17¾	14	400	16½	16	16	Mission Corporation	1,399,345	N.P.	25c	12-24-37	.45	34	15	29⅞	16¾
23	14¼	26,900	23	19½	21⅞	National Supply	382,591	$25	$2 pf.‡	12-22-37	....	41⅜	17⅝	75½	19⅞
14⅞	11⅞	10,800	14	13¼	13⅞	Ohio Oil Co.	6,563,377	N.P.	50cSA	12-15-37	.60	22⅞	9	18	12⅛
15⅞	11¾	1,400	13¾	12½	13¾	Pacific Western Oil	1,000,000	N.P.	75c	12-15-37	.65	29¾	11¾	23½	11¾
9¼	8	100	9¼	9¼	9¼	Pan American Pet. & Trans.	4,702,945	$5	$1 *	12-21-37	.60*	17⅛	7	20⅝	12¼
42¼	34⅛	13,800	40⅜	38¼	39¾	Phillips Petroleum	4,449,052	N.P.	50cQ	3-1-38	2.50	64	30⅛	52⅜	38⅛
19½	16¼	4,100	19¾	18¼	19½	Plymouth Oil Co.	1,050,000	$5	35cQ	9-30-37	.90	29⅞	13	27¾	11⅞
13½	10¼	28,200	12½	11⅝	12⅛	Pure Oil Co.	3,281,120	N.P.	25c	12-1-37	....	24⅜	8¾	27⅞	16
7⅞	5⅜	4,100	6⅞	6⅜	6⅞	Richfield Oil Corp.	3,986,638	N.P.	25c	12-24-37	....	6½	4⅛	..	..
27½	20	16,200	27½	24¼	26½	Seaboard Oil of Delaware	1,224,283	N.P.	25cQ	12-15-37	1.00	54⅛	16	44	30½
18¼	14⅜	2,600	16½	15¼	16⅜	Shell Union Oil	13,070,625	N.P.	50c	12-20-37	.25	34¾	14⅞	28¼	14¾
34¾	24⅛	2,000	30⅞	29¼	29¼	Skelly Oil	1,006,348	$15	50c	12-15-37	....	60⅝	26½	47⅜	19½
16⅜	13¾	19,500	15⅞	15⅜	15⅜	Socony-Vacuum	31,151,071	$15	25c	3-15-38	.70	23¼	13	17½	12½
33⅞	28⅝	7,800	33⅞	32	33⅛	Standard Oil of California	13,014,754	N.P.	35cQ†	3-15-38	1.20	50	27⅛	47⅝	35
35½	31⅞	5,000	34½	32¼	33¾	Standard Oil (Indiana)	15,196,241	$25	25cQ	3-15-38	2.40	50	26½	48½	32¾
35½	34	No Sales	..	..	..	Standard Oil of Kansas	134,841	$10	$5	12-20-37	1.00	43	30⅝	31	25
54⅛	44½	38,600	54⅛	51⅛	53	Standard Oil of New Jersey	25,856,081	$25	$1.25SA†	12-15-37	2.00	76	42	70⅜	51⅛
57⅞	48½	900	51½	50½	51	Sun Oil	2,156,825	N.P.	25cQ	3-15-38	$1 & 6% Stk.	77½	44½	91	70
3⅜	2½	5,000	2⅞	2⅝	2¾	Superior Oil Corp.	1,388,079	$1	....	....	....	7¾	1½	6¾	3
44⅞	37¼	23,800	44¾	42⅛	43⅞	Texas Corp.	10,896,858	$25	50cQ	4-1-38	1.50	65⅛	34¾	55¼	28⅞
4⅞	3⅝	2,800	4½	4¼	4⅜	Texas Gulf Producing Co.	888,134	N.P.	10c	12-23-37	.05	9⅝	2	8⅞	4⅜
10⅛	7⅜	13,300	10⅛	9½	9⅝	Texas Pacific Coal & Oil	888,237	$10	10c	3-1-38	.25	16⅝	5⅜	15¼	7½
15½	13½	15,800	15⅛	13⅞	15	Tide Water Associated	6,288,512	N.P.	25cQ	3-1-38	.70	21⅝	13⅛	21¾	14¾
21⅝	18½	3,500	21⅝	20⅞	21½	Union Oil of California	4,386,070	$25	30cQ	2-10-38	1.00	28¼	17½	28½	20¾
23½	21⅞	400	22¾	22½	22¾	Union Tank Car Co.	1,200,000	N.P.	40cQ	3-1-38	1.20	31½	22	31⅝	22⅝
2¾	2¼	500	2¾	2⅝	2⅝	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	6¼	1¾	5¼	2¾

*Payable in 3½% notes. †Includes extras. ‡One-tenth share $2 preferred stock.

New York Curb Exchange

1938 High	1938 Low	Week ending Feb. 26 Sales	Week ending Feb. 26 High	Week ending Feb. 26 Low	Week ending Feb. 26 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1936	1937 High	1937 Low	1936 High	1936 Low
9⅜	7¼	2,300	8⅞	8½	8½	American Republics Corp.	1,308,049	$10	30c	12-27-37	....	10	6⅝	..	..
10¼	8¼	1,400	10¼	9¼	10⅛	Bridgeport Machine Co.	260,000	N.P.	1.25	12-30-37	$1.00	21⅜	7	21	13¼
39	35	50	37¼	37¼	37¼	Buckeye Pipe Line Co.	200,000	$50	75cQ	3-15-38	3.25	51½	36	50	39¾
107	100	No Sales	..	..	..	Chesebrough Mfg. Co.	120,000	$25	$1.50Q†	3-21-38	7.00	123	95½	124¾	105
2	1⅝	17,300	1¾	1⅝	1¾	Cities Service	37,804,394	N.P.	....	6-1-32	....	5⅜	1½	7⅜	3
2⅜	1½	5,200	2⅛	1¾	1⅞	Cosden Petroleum	399,687	$1	....	..	....	5½	1½	4½	1½
27½	22½	11,000	27¼	25	26¾	Creole Petroleum	6,974,356	$5	50cSA†	12-15-37	.50	38¾	20¼	39	19⅞
8¾	7	1,100	8½	7⅞	7½	Darby Petroleum	351,390	$5	25cSA	1-15-38	.50	18⅝	6½	18⅛	9
3½	2½	No Sales	..	..	..	Derby Oil & Refining	263,162	N.P.	....	.....	....	8⅜	2¼	6¾	1⅞
31	31	No Sales	..	..	..	Eureka Pipe Line	50,000	$50	$1Q	2-1-38	4.00	47½	24½	47½	38½
42⅞	37	5,000	42⅞	41½	42	Gulf Oil Corp.	9,076,202	$25	25cQ	12-1-37	1.50, 100% Stk.	63½	33	59	36
70	60	3,200	70	65	69	Humble Oil & Refining	8,923,935	N.P.	37½c	4-1-38	1.50	87	54⅞	80	57
19¼	17⅞	700	19¼	19	19¼	Imperial Oil of Canada	26,919,871	N.P.	62½cSA†‡	12-1-37	1.25	24¼	14½	24½	19¾
7¾	6⅝	300	7¾	7½	7¾	Indiana Pipe Line	300,000	$10	50cSA	11-15-37	.80	15	5⅞	9¾	5½
31	28½	2,500	31	30½	31	International Petroleum	14,247,088	N.P.	$1.25†‡	12-1-37	2.50	39½	23½	39⅝	32⅝
5	3¼	1,900	4¾	4⅛	4½	Kirby Petroleum Co.	500,000	$1	10c	9-15-37	.20	8¾	2⅜	5¾	2⅝
25⅛	18¾	2,800	23¾	22½	22¾	Lion Oil Refining	270,000	N.P.	50cQ†	12-24-37	.75	34	12½	17¾	7⅜
9¼	7⅛	2,800	8⅛	7⅞	7⅞	Lone Star Gas	5,382,723	N.P.	20c	4-20-38	.60	14¼	5¼	14¼	9⅞
9⅜	8⅛	3,600	9¼	9	9	Louisiana Land & Exp.	3,000,000	N.P.	20cQ†	12-15-37	.50	15¼	6¾	15⅜	9⅞
8	7	700	8	7⅝	7⅝	Midwest Oil Co.	998,444	$10	50c	12-15-37	....	14⅝	6¼	..	..
5¼	4⅝	900	5¼	5⅛	5¼	Mountain Producers	1,682,182	$10	30cSA	12-15-37	.60	7⅞	4⅛	8⅜	5
14⅝	13	700	14¼	13⅜	14¼	National Fuel Gas	3,810,183	N.P.	25cQ	1-15-38	1.00	19½	12	23	17⅜
9¼	7¾	700	9¼	9	9¼	National Transit	509,000	$12.50	55cSA	12-15-37	.75	12½	7¼	15¾	9¼
2⅝	1¾	600	2⅜	2⅜	2⅜	New Mexico and Arizona	1,000,000	$1	1c	12-1-36	.01	5	1⅛	6⅝	1⅝
4½	4	No Sales	..	..	..	New York Transit	100,000	$5	15c	4-15-38	.35	5⅜	3⅞	6¼	4¼
6	5½	500	6	5¾	5¾	Northern Pipe Line	120,000	$10	25cSA	12-1-37	.40	12¾	5¾	9¾	4⅞
7⅜	5⅜	43,800	7⅜	6¾	6⅞	Pantepec Oil	1,608,700	N.P.	....	.....	....	9⅝	2¾	10⅛	3¼
3½	2⅞	400	3⅛	2⅞	3⅛	Root Petroleum Co.	336,045	$1	25c	2-1-37	.50	13¾	2	19¼	4½
4	3⅛	700	3¾	3½	3⅝	Ryan Consolidated	296,931	N.P.	....	.....	....	6½	2¼	4⅜	1⅞
5⅜	4⅜	No Sales	..	..	..	Southern Pipe Line	100,000	$10	15cSA	3-1-38	.25	7¼	3⅞	7⅞	3¼
38¾	37¼	200	38¾	38⅛	38¾	South Penn Oil	1,000,000	$25	$1.15Q†	12-28-37	2.60	56	35	44	32½
38½	37¼	No Sales	..	..	..	Southwest Penna. Pipe Lines	35,000	$50	50cQ	12-31-37	13.00	42	20	60	44
18	17	1,100	17¾	17½	17¾	Standard Oil of Kentucky	2,604,790	$10	25c	3-15-38	1.35	21⅛	14¾	23⅜	17⅛
7½	6½	200	6⅝	6½	6½	Standard Oil of Nebraska	188,403	$25	25c	3-29-37	.25	13¾	8	14⅝	11
22	19	200	21½	21½	21½	Standard Oil of Ohio	753,740	$25	25c	3-15-38	2.00	45	16	40	21¾
3¼	2⅞	4,700	3⅛	3	3	Sunray Oil	1,910,119	$1	10c	12-24-37	.10	4⅞	2	5	2⅝
4⅜	4	400	4¼	4⅛	4¼	Texon Oil & Land	336,028	$2	15cQ	1-3-38	.60	7⅝	2	9¾	5⅜
7⅝	5½	1,800	6¾	6⅛	6¾	Transwestern Oil Co.	750,000	$10	....	.....	....	13⅞	4⅝	..	..
5¼	3½	9,600	4½	4⅛	4⅛	United Gas Corp.	7,818,959	$1	10c	9-15-37	.20	13⅝	3	10¾	4

†Includes extras. ‡Payable in Canadian funds.

Note—In comparing highs and lows for the several years in the two tables, it will be necessary to take into consideration cases where there have been stock split-ups.

PERSONAL

D. B. McCONNELL, manager of the Northwest Louisiana district of the Department of Conservation, supervised an inspection trip to the storm area in the Rodessa field last week. He was accompanied by D. COOK and H. C. LESSENGER, agents of the department.

H. C. COOPER, president of the Hope Natural Gas Company, Pittsburgh; DR. LEWIS L. NETTLETON, geophysicist of the Gulf Oil Corporation, Pittsburgh, and C. B. McCLINTOCK, geologist and petroleum engineer, Oil City, are giving weekly lectures to senior students in the University of Pittsburgh school of petroleum and natural gas engineering during the second semester.

R. BRUCE HAYNES has been appointed head of Pure Oil Company's new field office in McAllen, Tex.

ARNOLD S. BUNTE, chief subsurface engineer for the Shell Petroleum Corporation in McPherson, Kans., has resigned to open private practice, with an office in the Brown Building, Wichita, Kans.

CARL L. MAYER, president of the Red Bank Oil Company, with offices in Houston, Tex., has announced his resignation effective April 1. Mr. Mayer will continue in the oil business in Houston.

C. I. ALEXANDER, geologist for the Magnolia Petroleum Company at Lake Charles, La., addressed the Houston Geological Society last week. He discussed a north and south cross section of the Louisiana Gulf Coast.

G. T. RHODEN, drilling superintendent for the Gulf Oil Corporation in the Cleveland and Segno fields, has been transferred to the Lake Charles district. He will be succeeded by JOE CADDEL, transferred from Lake Charles.

JOHN ABRAMS was elected president and general manager of the Inglewood Gasoline Company in Los Angeles, Calif. E. H. BASHAW was chosen vice president and BYRON F. STORY secretary. The three comprise the board of directors.

E. H. MOORE, president of E. H. Moore, Inc., Tulsa, flew to California last week in the company's airplane to inspect extensive holdings in the Santa Maria Valley field. He was accompanied by G. M. WELLING, secretary-treasurer; A. G. TYDINGS, assistant treasurer, and TOM D. PARKS, pilot, all of Tulsa, and by J. E. MABEE, drilling contractor, of Midland, Tex. Mr. Moore planned to remain in California a month. The others returned home after a five-day stay.

DOUGLAS F. HICKOK, Olean, N. Y., and MISS GRETCHEN HEASLEY, Bradford, Pa., were married recently. Mr. Hickok is a grandson of N. V. V. FRANCHOT, pioneer operator in the Allegany field of New York and is associated with him in Mr. Franchot's extensive producing interests.

WILL J. REID was reelected president and GEORGE P. DEANE first vice president at the annual meeting of the Hancock Oil Company in Long Beach, Calif. Other officers chosen are: E. E. PYLES, vice president in charge of production; W. T. HANCOCK, treasurer; JOHN W. HANCOCK, secretary, and C. B. LIMBOCKER and H. S. HOLLOWAY, assistant secretaries.

ROBERT GRANT, JR., of New York, and CHIFIELD ANDREWS, ROBERT F. HOLDEN, EDWARD SAMPSON, and A. C. YARNELL, of Philadelphia, directors of the Salt Dome Oil Corporation, were business visitors at the company's offices in Houston, Tex., the past week.

JOHN McFADYEN, vice president of the Ohio Oil Company, went to California from his Casper, Wyo., office last week to witness completion of the second well in the Canal field, discovered by his company several months ago. At the location, 12 miles west of Bakersfield, Mr. McFadyen was joined by E. C. BOLTON, Ohio's general superintendent in California; GLENN B. GARIEPY, chief geologist in California; A. J. ROSENLIEB, state production superintendent; FRED SMITH, San Joaquin Valley production superintendent; BEN HOLLANDSWORTH, drilling superintendent, and several interested employes. The well came in for 2,184 bbls. a day through a choke.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

Robert S. Hampton, general auditor for a number of Standard Oil subsidiaries, will retire on March 5 at the age of 60, after 22 years' service with the organization. Failing health is given as the cause of his retirement.

The Sun Company enters Oklahoma and has established offices in Tulsa with H. N. Cole in charge of land and leasing.

Since Pennsylvania oil rose to $2.75 per barrel the South Penn Oil Company has advanced its pumpers' wages from $71 to $75 per month. In many cases this includes house, heat and light.

The Association of Natural Gas Supply Men has been organized with David O. Holbrook of Pittsburgh, Pa., as chairman.

20 YEARS AGO

L. W. Young, Jr., has been chosen president of the South Penn Oil Company succeeding Joseph Seep, who resigned to become chairman of the board. Mr. Young went to the South Penn Oil Company from the Carter Oil Company, western division.

Mexican bandits rob and kill Edgar House, paymaster for the Texas Company in the Tampico oil fields.

William N. Davis, of Bartlesville, Okla., has been made a member of the advisory board of the Treasury Department at Washington. His duties will be mostly connected with oil tax matters.

10 YEARS AGO

James J. McGraw, 54, Tulsa banker and oil man, dies at Hot Springs, Ark., after a short illness.

J. H. (Cal) Wright, wealthy Sapulpa, Okla., producer, dies at his home.

John E. Andrus, Yonkers, N. Y., capitalist, who advised the Standard Oil Company to buy the Bayonne, N. J., meadows as a site for a Standard refinery, which the company did, is hale and hearty at 87 years. In appreciation the company let him have Standard shares on credit, allowing the dividends to pay for the stock. "My! How those shares have grown!" says Mr. Andrus.

T. J. AHERN, of the Costa Oil Company, has returned to Houston, Tex., from a business trip to South America.

K. A. WALKER, who has been scout at Centralia, Ill., for the Skelly Oil Company, has been transferred to Shreveport, La.

DON T. ANDRUS, well-known producer in the Bradford field, has been elected a member of the Bradford, Pa., district school board.

W. A. MALEY, division geologist of the Humble Oil & Refining Company in South Texas, was elected president of the South Texas Geological Society at the recent meeting in San Antonio.

BEN C. AMMANN, formerly chief warehouseman at the Cosden Petroleum Corporation's Big Spring, Tex., refinery, has been promoted to purchasing agent for the company at its main offices in Fort Worth, Tex.

K. KURODA, of the Asano Bussan Company, Ltd., New York, and K. KUDO, an engineer in the Imperial Japanese navy, are making a tour of the Mid-Continent territory, in search of information regarding oil conditions.

LEO McCLOSKEY, vice president of Imperial Oil Company, Ltd., Toronto, Canada, returned last week after spending several weeks in Peru, where the company is the largest oil producer. MRS. McCLOSKEY accompanied her husband on the trip.

DARWIN BENEDUM, petroleum geologist, of San Antonio, Tex., left last week on a coastwise trip to New York, there to spend several days before going on to Albany to visit relatives. He will return home by way of New Orleans, where he will attend the convention of the American Association of Petroleum Geologists, March 16-18.

PARAGRAPHS

GEORGE FITZGERALD, chief chemist in the Socony-Vacuum Oil Company plant in Olean, N. Y., spoke on "Chemistry of Petroleum" before the Olean Catholic Action Club at its meeting last week.

DR. W. A. VER WIEBE, head of the department of geology at the University of Wichita (Kans.) and editor of the monthly bulletin of the American Association of Petroleum Geologists; H. B. FUQUA, Fort Worth, Tex., president of the association, and chief geologist in North Texas for the Gulf Oil Corporation; IRA CRAM, association secretary and division geologist of the Pure Oil Company in Tulsa, and ED KOESTER, president of the Kansas Geological Society and district geologist of the Darby Petroleum Corporation in Wichita, held a conference concerning work of the association in Wichita last week. Mr. Fuqua was guest speaker at a luncheon of the Kansas Geological Society, touching important points in Texas oil developments in 1937 and explaining the field in Wichita and Archer counties.

A. A. MacKRILLE, of New York, has been appointed manager of the new national accounts department created by the Shell Union Oil Corporation.

J. L. COOLEY, refinery engineer, has been transferred back to the Standard Oil Company of California in San Francisco. H. B. NICHOLS has succeeded Mr. Cooley with the Bahrein Petroleum Company organization in New York.

WALTER ELLIOTT, general drilling superintendent for the Shell Oil Company on the Pacific Coast, spent most of last week in Bakersfield, where he was accompanied on field trips by ELI PETERSON, San Joaquin Valley drilling superintendent.

URSEL S. ARMSTRONG, formerly of Los Angeles, Calif., is en route to Arabia, where he will do geological work for the California Arabian Standard Oil Company. After crossing the Atlantic to England by steamer, he planned to make the remainder of the trip by airplane.

RALPH J. SCHILTHUIS, petroleum engineer for the Humble Oil & Refining Company, Houston, Tex., is to be guest speaker before the Fort Worth Geological Society on March 8. His subject will be "Connate Water in Oil and Gas Sands." He is to speak on the same subject before the Dallas society on the evening of March 7.

ANGUS McLEOD, chief geologist for the Shell Oil Company in Los Angeles, has resigned to engage in consulting geology and engineering. For 15 years previous to his work in California, Mr. McLeod was exploration manager for the Shell Petroleum Corporation in Texas, New Mexico, Louisiana, and Arkansas. Although he will maintain his residence in Los Angeles, he expects to spend much time in the territory of his early activity.

G. CARLTON HILL and R. B. SMETHURST were elected directors of the Valvoline Oil Company at a meeting in Cincinnati, Ohio, increasing the directorate from 12 to 14. Other directors and officers were reelected.

F. S. CLULOW has been appointed manager of the manufacturing department of the Shell Oil Company, and he will direct its activities from the head offices in San Francisco. Mr. Clulow was assistant superintendent of the Martinez refinery from 1930 to 1934 and then was transferred to East Chicago, Ill., as superintendent of the Shell refinery there. He returns to the Pacific Coast from East Chicago.

D. L. CALDWELL, of the Barnsdall Oil Company, chairman of the production practice committee, American Petroleum Institute, and R. L. KEYES, of the Texas Company, chairman of the drilling practice committee, spoke at the February meeting of the Los Angeles Basin chapter of the Institute in Los Angeles.

LEWIS B. VAN LEUVEN, member of the Socony-Vacuum Oil Company, Inc., manufacturing committee, has retired after 46 years of service. He entered the oil business as an office boy with Thompson & Bedford, and in later years supervised construction of Vacuum Oil Company and Socony-Vacuum plants in Bayonne, Paulsboro and other points.

Started to Be Banker

Russell M. Riggins, treasurer of the Phillips Petroleum Company, started out in 1907 to be a banker, but his friends say he reformed. He was only 13, but he was quick at figures, and he got a place in the bookkeeping department of a bank in Asher, Okla. With the ripened judgment of 15, however, he decided the railroad field offered wider opportunities. Beginning as a station apprentice for the Frisco Lines in Stroud, Okla., he held various positions during the next 11 years, all allied with shipping. He was executive accountant for Armour & Company, in Oklahoma City, when in 1920 he organized the firm of Riggins & Beck, certified public accountants, with offices in five different cities, including Washington, D. C. The firm handled the accounts of important oil companies, which resulted in Mr. Riggins gaining a comprehensive knowledge of the financial side of the oil industry. So it came about that in 1922 he joined the Independent Oil & Gas Company as assistant secretary and assistant treasurer. At the time of the merger with the Phillips Petroleum Company in 1930 he was treasurer, member of the executive committee, and a director. After the merger he was made comptroller, which post he held till he was advanced to treasurer a few months ago.

RUSSELL M. RIGGINS

Mr. Riggins married Jessie Ruth Spires, and they reside in Bartlesville, Okla. He is active in technical and social organizations. His hobby is saddle horses of the show type and he is a member of the Hillcrest Saddle Club of Bartlesville. He is a major in the Organized Reserve Corps.

DICK SCHWAB, independent producer of Houston, Tex., is spending several weeks in Arizona recuperating from a recent operation.

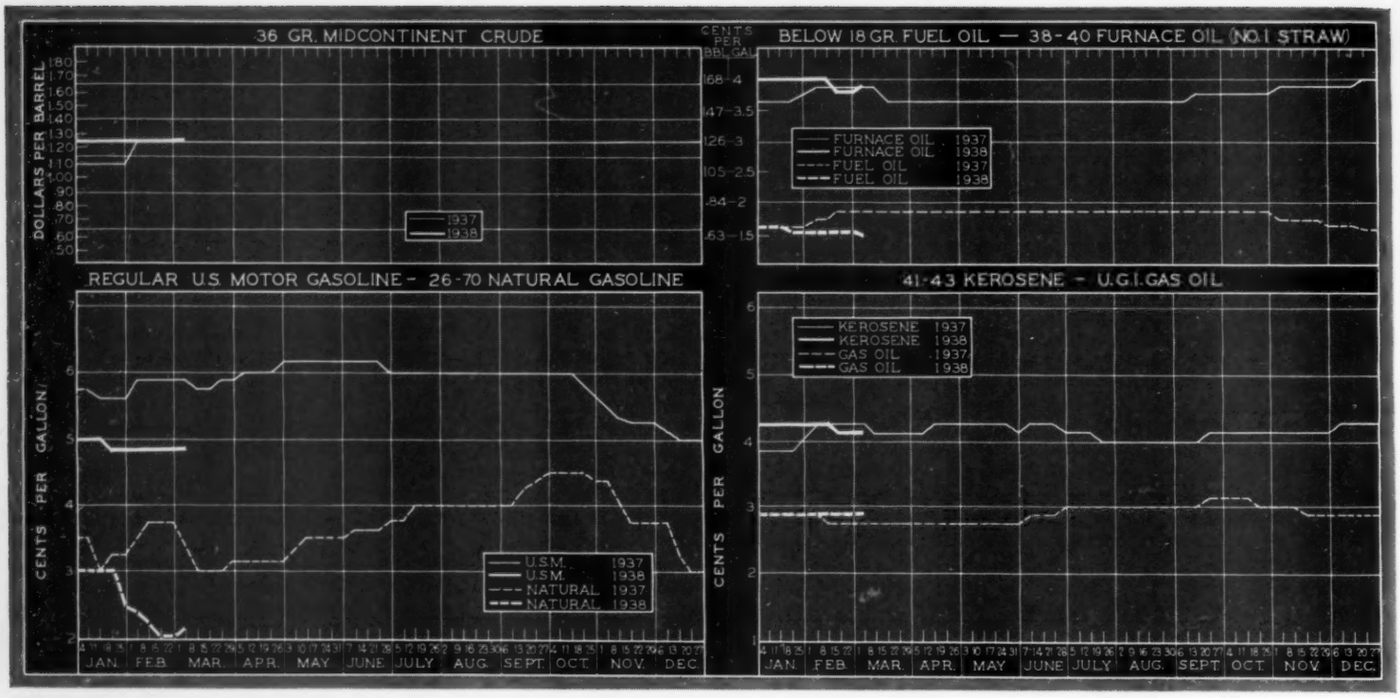
WALTER HELMS, of Texarkana, has been appointed by the governor of Arkansas to the State Board of Conservation, replacing WALTER L. BROWN, of El Dorado.

J. D. STIRLING, assistant traffic manager, Socony-Vacuum Oil Company, Inc., was the principal speaker at the annual meeting of the Oil City-Franklin Traffic Club in Oil City, Pa., last week.

T. E. SWIGART, vice president of the Shell Petroleum Corporation, St. Louis, Mo., spent several days in Houston, Tex., last week on a combined business and pleasure trip. Mr. Swigart for several years prior to recent months was executive vice president of the company in Houston.

LLOYD H. METZER, formerly geologist in the California division of oil and gas in Los Angeles, is now in the geophysical department of the Superior Oil Company in Bakersfield. Mr. Metzer is the author of the recent bulletin of the division of oil and gas, "The Del Rey Hills Areas of the Playa Del Rey Field."

H. D. BELL, former superintendent of production for the Gulf Oil Corporation in the Electra district of North Texas, has been transferred to Breckenridge as general superintendent in the Breckenridge, Nocona and Electra districts. Mr. Bell was assigned to the Electra district in 1913. He entered the oil business during the Goose Creek boom with the Guffey Petroleum Company, which later became the Gulf organization. WILLIAM NEEDHAM, of Nocona, was transferred to Electra as production superintendent to succeed Mr. Bell, and W. C. HOWELL, of Electra, has been promoted to fill Mr. Needham's post in Nocona.



Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Gasoline Holds Strength in Group 3 Area and Naturals Start Climb

By T. F. SMILEY

A little less indigo tinged market sentiment in the Group 3 area this week. Natural gasoline was on the up grade. Motor fuel was giving no ground. High-gravity heating oils were tight. Lubricants looked a little better. The spring demand for tractor fuels was rising. There still were things to worry about, but the trade was more disposed to be hopeful.

The right-about of natural gasoline had a tonic effect generally. Several circumstances contributed to the advance. In recent weeks, while the naturals were burrowing into the bottom of the price graph, manufacturers who had storage facilities were refusing to sell the 26-70 grade in the spot market because quotations did not cover cost of manufacture, and they reasoned that if they held the material they eventually might get a price which at least would not draw on the red ink. This helped. Operating also to check accumulation of distress stocks of the 26-70 was the fact that huge quantities were being stabilized to 12 and 14 pounds, in which form they entered into competition with the low- and middle-octane refinery product.

Texas Shutdown an Aid

The Texas one-day-a-week shutdown is not to be overlooked. That shutdown not only has taken four days' production of crude out of the market each month, but it has taken four days' output of natural gasoline from the market too, since the wet gas from which the natural is made is produced with the crude.

Although the spring motor fuel which refiners now are making needs less natural than the winter grade, nevertheless the requirements are substantial. Refiners who wanted 26-70 in the past week or so discovered supplies no longer were looking worriedly for outlets, and they had to offer higher prices to lure material from storage. Belief was expressed in the trade that the naturals were likely to work into better position.

Sales managers and brokers said real shortage had developed in the No. 1 furnace oil, both white and straw, and quotations had moved up. One reason was said to be that the No. 1, blended with naphtha, makes an excellent tractor fuel, and with the seasonally growing demand from tractor owners, in both agricultural and industrial fields, large volumes were being disposed of that way. Some plants reported they were down to the tank bottoms.

There was no blinking the fact that, with minor exceptions, the grades below the No. 1 were still a problem, for an unexpectedly mild winter had resulted in big inventories being left in refiners' hands. Vigorous measures were being employed to dispose of them.

Refined Oil Market Barometer

Weakness of the heating oils, resulting from moderate temperatures, is more pronounced, excepting that in some regions the highest-gravity material is in active demand. Although nearness of motoring weather is imparting a little better tone to gasoline, mounting stocks continue to act as a market depressant. Seasonal increase in use of tractors and trucks is helping lubricants.

MID-CONTINENT. Gasoline holding well. Heating oils below No. 1 grade weaker.

EAST COAST. Heating oils off. Gasoline drifting downward under pressure of big stocks.

GULF COAST. Gasoline and heating oils lack strength. No changes in prices.

CALIFORNIA. Natural gasoline easier. Kerosene soft. Fuel oil and diesel unchanged.

PENNSYLVANIA. Gasoline soft. Lubricating oils slightly improved. Kerosene off. Wax lower.

CHICAGO. Gasoline steady. Kerosene moderately improved. Higher-grade heating oils firm.

Gasoline Holds Its Strength

Gasoline was holding its strength, and a few said it looked a little better than last week. Brokers reported offerings were not so plentiful. Some refiners who make it a special point to take care of regular spot-market customers said they were sold up and that they were turning to brokers for supplies to supplement their own. Special strength which was noted in the 63- to 66-octane last week seemed to have shifted to the 67-69, the principal reason apparently being that with the approach of spring a higher-octane material is called for.

Only a few refiners continued to operate in the East Texas area. Most of those still active were running on crude obtained from outside that field, the East Texas crude being more expensive. The refinery of the Bay Petroleum Corp., in McPherson, Kans., has joined the inactive list.

Faint signs of improvement were reported in the lubricant group, and it was believed a few days of pleasant weather would stimulate demand from farms and from operators of truck fleets.

Big Stocks and Falling Demand Send Eastern Markets to Lower Ground

By H. STANLEY NORMAN

NEW YORK, March 1.—The harassed petroleum markets continued to drift into lower ground last week under the pressure of record breaking motor fuel stocks and light demand for most grades of fuel oil.

Stocks of both motor fuel and burning oils were stacking up along all fronts depressing the tanker rates quoted to the coastwise trade and contributing another blow indirectly to the market in general.

Gradual pick-up in gasoline consumption is expected to start this month, but whether it can stem the tide of mounting stocks is a question in the industry. Accompanying the expected upturn in gasoline requirements from the low levels of midwinter will be a compensatory decline in fuel oil consumption for domestic heating purposes. However, most sections of the country which figure extensively in heating oil consumption will remain cold for two months to the extent that some furnace operation will be required.

Evils accompanying a weak gasoline market are making their appearance over a long stretch of the Atlantic seaboard market. Loaning of delivery equipment reached a scale in Virginia last week, which along with price shading, caused a break of a half cent per gallon in the general tankcar and tank-wagon markets. The cut, made effective February 23, was general throughout the state.

While Virginia was the only Atlantic seaboard state which figured in a general market break last week, price cutting of an eighth to a quarter of a cent per gallon in the open tankcar gasoline market was reported at Baltimore, Philadelphia, New York, Providence and Boston. Tankcar and tank-wagon gasoline prices were lowered a half cent per gallon at Bristol, Tenn. Major company quotations in the Newark, N. J., and New York tankcar and tank-wagon markets were unchanged, but spot sales were being made at fully a half cent per gallon lower and in some isolated instances as much as three-quarters cent less. Instances of sales of 65 octane gasoline at New York at less than 6½ cents per gallon were infrequent, but traders said firm offers would attract limited quantities. The bulk of business, scarce as it was in the spot market, was reported at the range of 6½ to 7 cents per gallon for 65 octane motor fuel. Movement against contracts is reported holding reasonably firm and in keeping with seasonal expectations in some directions. Other dealers in this district report their motor fuel business is definitely below 1937 for the first two months.

In some quarters the summer motoring season is near enough to obliterate deep-seated fears over the gasoline market for the immediate future. Even those inclined to the cheerful viewpoint, however, are skeptical over fall and winter business of 1938. There is the fear that refinery runs will be increased to summer proportions when the motoring season starts eating into present stocks. If refinery operations are increased to the rate prevailing in the summer of 1937, careful observers visualize a market "crack-up" as inevitable.

The alternative to a sluggish summer market and a winter of trouble in 1938-39, according to many students of the statistical picture, is the maintenance of refinery operations at approximately the current rate. This projection will also involve the production phase of the industry in a summer of restraint, that is curtailment below standards which would be justified if stocks had not been permitted to reach the levels attained this winter.

Contributing to the rise of gasoline stocks this winter has been a relatively slack demand for fuel oil. Mild average temperatures have prevailed in some of the heaviest consuming sections leaving little incentive to refiners to reduce their cracking operations.

Effect of mild weather on the fuel oil market was emphasized again last week. In the New York area, temperatures averaged well above the freezing point all week and the fuel oil and kerosene markets turned soft in immediate response. Considerable light fuel oil was reported offered in tank-wagons to the New York area consumers last week at 6½ cents per gallon.

Standard Oil Co. of New Jersey lowered tankcar prices a quarter cent per gallon on practically all grades of fuel oil to the New York trade yesterday and today. Other sellers followed the movement to lower ground. Nos. 2, 3, and 4 heating oils were lowered to 4¾ cents to the New York tankcar trade, and industrial fuel, gas oil, and shore plant diesel were lowered a quarter cent, effective February 28. Kerosene, or No. 1 heating oil, was lowered to 5¾ cents in New York, effective March 1.

Practically all of last week's tanker chartering activity was confined to the transatlantic trade with rates ranging around 27 shillings. One boat was chartered for April voyage from the Gulf Coast to the French Atlantic for 26 shillings 9 pence. Boats are available on time charter at from 6 to 7 shillings and some of the older boats are even offered below these figures. The lowest coastwise fixture reported was at 24 cents for a cargo of No. 2 fuel oil.

The softening tanker rate figured in a slight weakening of Bunker C fuel oil conditions in the north Atlantic last week, but a majority of quotations were steady at $1.25 per barrel. Practically all of this trade is confined to contract deliveries, although occasional spot bunkering business enters the picture, bringing out the weakness, if any exists.

Heavy fuel oil for shore plant delivery was generally offered in New York at a range of 3½ to 3¾ cents per gallon.

Heavy fuel oil was also weak and in slack demand in western Pennsylvania where competition from Michigan and Ohio refinery centers exerted pressure. Inactivity of several automobile plants in the Detroit area is throwing abnormal supplies of heavy fuel oil on outlying markets with encroachment reported into the eastern Ohio, western Pennsylvania and western New York areas.

Slack demand for industrial fuel oils in most northeastern sections of the country has been one of the depressing features of this winter's market. The pressure has not been acute in areas outside of the manufacturing districts but the industrial traffic has been at a reduced rate almost for duration of the winter. The slackened activity of industrial plants has also acted as a depressant on railroad operations which in turn has reduced heavy fuel oil consumption.

Tankcar prices for kerosene declined slightly last week in Pennsylvania. The decline was generally restricted to no more than a quarter of a cent per gallon. Kerosene in New York was quoted at 6 cents per gal-

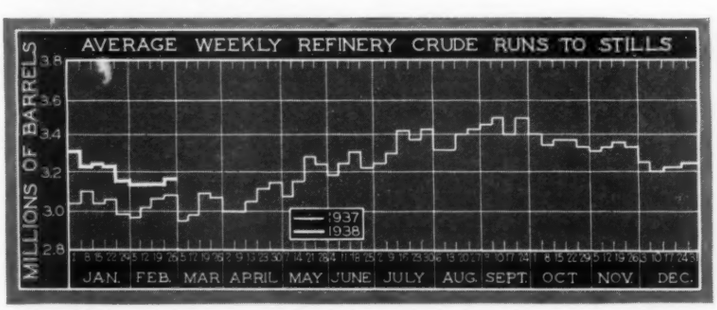
(Continued on Page 120)

A. P. I. Weekly Refinery Statistics

Week Ending February 26, 1938

	Capacity reporting (per cent)	Daily crude runs (bbls.)	Total gasoline stocks	Gas oil and fuel oil stocks
East Coast	100.0	499,000	20,986,000	10,366,000
Appalachian	88.4	109,000	3,718,000	1,287,000
Indiana, Illinois, and Kentucky	92.4	404,000	15,431,000	6,864,000
Oklahoma, Kansas, and Missouri	84.7	255,000	7,940,000	3,431,000
Inland Texas	56.6	134,000	2,844,000	1,541,000
Texas Gulf	95.7	737,000	14,151,000	9,349,000
Louisiana Gulf	96.6	139,000	2,392,000	3,090,000
North Louisiana and Arkansas	63.7	35,000	508,000	506,000
Rocky Mountains	69.7	47,000	2,290,000	735,000
California	90.9	531,000	15,499,000	81,149,000
Total reported	89.0	2,890,000	85,759,000	118,318,000
Estimated unreported	.....	280,000	4,960,000	2,640,000
*Estimated total	.....	3,170,000	90,719,000	120,958,000
*Estimated total previous week	.....	3,150,000	89,774,000	119,948,000
*February 27, 1937	.....	3,085,000	76,616,000	99,176,000

*Bureau of Mines, currently estimated.



Stocks of Crude Oil in the United States

(BUREAU OF MINES ESTIMATES)

Week ending February 19, 1938	305,219,000 barrels
Week ending February 12, 1938	304,915,000 barrels
Week ending February 20, 1937	288,480,000 barrels

Retail Oil Markets

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of March 1, 1938

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline is the regular or standard grade. In most areas a third grade and a premium grade are also available.

Standard Oil Co. (Indiana)

	Gasoline			Kero.
	Tank wag.	Dlr.	Inc. tax	tank-wag.
Chicago, Ill.	15.3	13 3	4.0	10.2
Decatur	15 3	13 1	4 0	10 2
Joliet	15.3	13 8	4.0	10 2
Peoria	15.3	13.8	4 0	10 2
Quincy	15.1	13.6	4 0	10 0
Davenport, Ia.	15 3	13 8	4 0	‡13 2
Des Moines	15.1	13.6	4.0	‡11.0
Mason City	15 4	13.9	4.0	‡13.3
Sioux City	15.3	13.8	4.0	‡13 2
Duluth, Minn.	17.0	15 5	5.0	10.9
Mankato	16.7	15.2	5 0	10 6
Minneapolis	16.7	15.2	5.0	10.6
Lacrosse, Wis.	16.7	15.2	5.0	10 6
Green Bay	17.0	15 5	5 0	9 9
Milwaukee	16 5	15 0	5.0	10 4
Detroit, Mich.	15 1	13 6	4 0	9 8
Grand Rapids	16.3	14 8	4 0	11 0
Saginaw	16.1	14 6	4 0	9 1
Evansville, Ind.	16 8	15 3	5 0	†10 7
Indianapolis	16 9	15 4	5 0	†10 8
South Bend	17.2	15.7	5.0	9.0
Fargo, N. Dak.	16 7	15 2	4 0	11 6
Minot	17.9	16.4	4 0	12.8
Huron, S. Dak.	17.1	15 6	5 0	11 0
Kans. City, Mo.*	14 6	13 1	4 0	9.5
St. Louis*	14 9	13 4	4 0	9 8
St. Joseph	14 6	13.1	4.0	9 5
Wichita, Kans.*	14.1	11.0	4.0	7.0

*State tax 2 cents, 1-cent city tax and 1-cent federal tax. †Does not include 4-cent state tax. ‡Iowa kerosene prices include 3-cent state tax.

(Exclusive of state general sales taxes, except Indiana and South Dakota.)

Discounts to commercial consumers: On purchases per month off tank-wagon prices: 1,000 gallons or more, 1.5 cents off; minimum delivery 25 gallons.

Stanolex Fuel Oil in Chicago

Effective Dec. 7, 1936, f.o.b. Chicago tank-wagon prices: Range oil, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7.3 cents. Stanolex No. 1, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7 cents. Stanolex furnace oil, 1-149 gallons, 7.8 cents; 150 gallons and over 7 cents. Stanolex A, 1-399 gallons, 5.75 cents; 400 gallons and over, 4.75 cents. Stanolex B, 1-799 gallons, 5.75 cents; 800 gallons and over, 4.75 cents.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline			Kero.
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank-wag.
Atl'tic, City, N. J.	12 75	11 25	4 0	8 5
Newark	12 75	11 25	4 0	8 5
Annapolis, Md.	14 85	13 35	5 0	9 5
Baltimore	14 25	12 75	5 0	9 0
Cumberland	16 65	14 15	5 0	10 0
Wash'g'n, D. C.	12 5	11 0	3 0	9 5
Danville, Va.	16 95	14 45	6 0	12.9
Norfolk	15.75	13 25	6 0	11 5
Petersburg	16 05	13 55	6 0	11 7
Richmond	16 05	13.55	6.0	11.7
Roanoke	17.25	14.75	6.0	12.9
Charles'n, W. V.	17 05	14 55	6 0	12 6
Parkersburg	15 35	13 85	6 0	11 2
Wheeling	16 25	14 85	6 0	12 2
Charlotte, N. C.	18 65	16 15	7 0	12 6
Hickory	19 15	16 65	7 0	13 0
Mt. Airy	18 95	16 45	7 0	12 8
Raleigh	18 25	15 75	7 0	12 1
Salisbury	18 75	16 25	7 0	12 7
Charleston, S. C.	17 25	14 75	7 0	11 7
Columbia	18 25	15 75	7 0	12 1
Spartanburg	18 95	16 45	7 0	12 9

Price basis to commercial consumers, effective March 8, 1937, in Maryland, District of Columbia, and in Arlington and Fairfax counties in Virginia; and March 12 in New Jersey: To contract accounts purchasing at least one full compartment at time by hose connection, on yearly purchases: From 2,500 to 100,000 gallons, consumer tank-wagon price at time and place of delivery; 100,000 gallons per year, consumer tankcar price plus .5 cent per gallon. Consumer tank-wagon price generally will be equivalent to dealer tank-wagon price less .5 cent per gallon.

Effective May 15, 1937, in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax counties): Commercial consumers taking deliveries of 50 gallons (W. Va., 100 gallons) or more at one time will be billed at posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons (W. Va., 100 gallons) will be billed at 4 cents per gallon over posted consumer tank-wagon price. Generally the posted consumer tank-wagon price will be the equivalent to the dealer price less .5 cent per gallon.

Discount for kerosene, 1 cent off tank-wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except no discount in New Jersey.

Southern District

STANDARD OIL CO. OF KENTUCKY

	Gasoline			Kero.
	Tank-wag.	Net dlr.	Inc. tax	tank-wag.
Atlanta, Ga.	21 0	18 0	7 0	*†14 0
Augusta	21 0	18 0	7 0	*14 0
Macon	21 0	18 0	7 0	*14 0
Savannah	19 5	16 5	7 0	*12 0
Birm'ham, Ala.	22 0	19 0	8 0	12.0
Mobile	21.0	18.0	9.0	†11.0
Montgomery	22 0	19 0	9 0	†13 0
Jackson, Miss.	20 0	17 0	7 0	*13 0
Vicksburg	20 0	17 0	7 0	*13 0
Jacks'ville, Fla.	22 5	17 5	8 0	†11 0
Miami	20 5	17 5	8 0	†12 5
Pensacola	22 0	19 0	9 0	12 0
Tampa	20 5	17 5	8 0	10 5
Lexington, Ky.	19 5	16 5	6 0	11 0
Covington	18 5	15 5	6 0	11 0
Louisville	19 0	16 0	6 0	10 5
Paducah	19 5	16 5	6 0	10 0

Price basis to tank-wagon consumers: Effective January 4, 1937, 3 cents per gallon below tank-wagon price. Kerosene prices in all states subject to 2 cents discount except in Kentucky where prices are net.

*Includes 1-cent state tax. †Subject to 2-cent discount.

Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax; and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon; Pensacola has a city gasoline tax of 1 cent.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline		Kero.
	Dealer	Inc. tax	tank-wag.
Denver, Colo.	15 0	5 0	11 5
Grand Junction	19 0	5 0	15 0
Pueblo	13.0	5.0	10.5
Casper, Wyo.	17 0	5 0	11 5
Cheyenne	16 0	5 0	13 0
Butte, Mont.	19 5	6 0	15 5
Billings	19 5	6 0	15 5
Helena	19 5	6 0	15 5
Great Falls	19 5	6 0	15 5
Salt Lake City, Utah	19 5	5 0	16 0
Twin Falls, Ida.	21 0	6 0	18 0
Boise	21 5	6 0	18 0
Albuquerque, N. M.	17 5	*6 5	12 0

*Includes city tax of one-half cent.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline			Kero
	Tank-wag. con'r.	Dividded dlr.	Inc. tax	tank-wag.
Ohio points	16.0	15.00	5 0	*13 0

*Includes state tax of 1 cent.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline			Kero.
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank-wag.
Albany, N. Y.	14 5	12 5	5 0	9 0
*Met. N. Y.:				
M'nh't'n, Br'nx	14 5	12 5	5 0	8 75
Staten Island	14 5	12 5	5 0	8 75
Q'ns. & Brklyn	14 5	12 5	5 0	8 75
Buffalo	14 0	13 04	5 0	7 5
Rochester	15 0	13 17	5 0	8 5
Syracuse	14 5	13 12	5 0	9 0
Boston, Mass.	13 0	11 5	4 0	8 5
Portland, Me.	14 5	12 7	5 0	8 75
Manch'ter, N.H.	15 0	13 0	5 0	9 0
Burlington, Vt.	14 9	12 9	5 0	9 5

*Does not include 2 per cent city sales tax which is calculated on basis of net retail price exclusive of state and federal taxes.

Price basis to undivided dealer: Posted dealer tank-wagon price less .5 cent. Price basis to commercial consumer. Effective Nov. 15, 1936, monthly purchases of 25,000 gallons and over, consumer tankcar prices at delivery point plus .5 cent per gallon; monthly purchases of 5,000 to 25,000 gallons, undivided dealer price at delivery point; monthly purchases under 5,000 gallons, pay divided dealer tank-wagon prices at delivery point.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline			Kero.
	Tank-wag.	Serv. sta.	Inc. tax	tank-wag.
San Francisco	17 5	18 5	4 0	11 5
Los Angeles	17 0	18 0	4 0	10 0
Fresno, Calif.	18 5	19 5	4 0	12 5
Phoenix, Ariz.	21 0	22 0	6 0	*17 0
Reno, Nev.	20 0	21 0	5 0	13 0
Portland, Ore.	20 0	21 0	6 0	13 5
Seattle, Wash.	20 0	21 0	6 0	13 5
Spokane	22 5	23 5	6 0	16 0
Tacoma	20 0	21 0	6 0	13 5

*Includes 5-cent state tax.

Discounts to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents; to split dealers, 2 cents. To commercial consumers: on tank-wagon price: on single deliveries of 40 gallons and over, advance quantity discount extended at time of delivery, 3 cents. Service station schedule applies on single deliveries less than 40 gallons. On kerosene in tankcar, transport truck and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank-wagon.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline			Kero.
	Tank wag.	Drl.	Inc. tax	tank-wag.
Omaha	17 7	16 2	6 0	10 5
McCook	17 5	13 5	6 0	10 0
Norfolk	18 1	16 6	6 0	10.9
North Platte	18 5	17 0	6 0	11 3
Scotts Bluff	19 2	16 0	6 0	12 0

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective Jan. 1, 1935.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline			Kero.
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank-wag.
N. Orleans, La.	19 0	16 5	*10 0	†12 0
Baton Rouge	17 0	14 5	8 0	12 0
Alexandria	17 5	15 0	8 0	10 5
Lafayette	18 0	15 5	8 0	12 5
Lake Charles	18 0	15 5	8 0	12.5
Shreveport	16 5	14 0	8 0	9 5
Kn'ville, Tenn.	20 0	17 5	8 0	14 0
Memphis	18 0	15 5	8 0	12 0
Chattanooga	19 5	17 0	8 0	13 5
Nashville	19 0	16 5	8 0	11.5
Bristol	19 0	17 75	8 0	14 5

*Includes 2-cent parish tax. †Includes 1-cent parish tax and 1-cent state tax.

Price basis to commercial consumers: Effective May 15, 1937, deliveries of 50 gallons or more in one delivery takes posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons at one time pay posted consumer tank-wagon price plus 4 cents per gallon. Generally, the posted consumer tank-wagon price will be equivalent to the dealer price less .5 cent per gallon.

Louisiana kerosene prices include 1-cent state tax.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline			Kero.
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank-wag.
Philadelphia, Pa.	13 25	11 75	5 0	10 5
Pittsburgh	15 0	13 0	5 0	11 0
Allentown	14 25	12 75	5 0	11 0
Erie	14 5	13 0	5 0	10 0
Scranton	14 5	13 0	5 0	11 0
Altoona	15 0	13 0	5 0	11 0
Dover, Del.	14 0	....	5 0	11 0
Wilmington	14 0	....	5 0	11 0
Springf'd, Mass.	13 5	....	4 0	8 5
Worcester	14 3	....	4 0	9 0
Hartford, Conn.	13 6	....	4 0	8 5
New Haven	13 5	....	4 0	8 0
Providence, R. I.	13 3	....	4 0	8 5

Price basis to undivided dealers, dealer tank-wagon price less .5 cent per gallon. Price basis to commercial consumers in Pennsylvania and Delaware, effective March 11, 1937: Consumers under contract using 100,000 gallons or more per year full compartment hose deliveries, tankcar plus .5 cent. Consumers under contract using less than 100,000 gallons per year compartment hose deliveries, undivided dealer price. Consumers under contract less than full compartment delivery, consumers not under contract less than full compartment delivery, and consumers not under contract full compartment delivery, divided dealer price. Less than 25 gallons, tank-wagon delivery, 4 cents per gallon above undivided dealer price.

Oklahoma and Arkansas

CONTINENTAL OIL CO.

	Gasoline			Kero.
	Dealer	Inc. tax		tank-wag
Muskogee, Okla.	14 5	5 0		7 0
Oklahoma City	14 0	5 0		8 0
Tulsa	14 0	5 0		6 0
Ft. Smith, Ark.	14 25	5.0		8.0
Little Rock	17 25	7 5		9 5
Texarkana	14 0	5 0		8.5

Texas

	Gasoline			Kero.
	Tank-wag.	Serv. sta.	Inc. tax	tank-wag.
Dallas, Tex.	15 0	19 0	5.0	8.0
Fort Worth	14 0	18 0	5 0	8 0
Houston	14 5	19 0	5 0	8 0
San Antonio	14 5	18.5	5 0	8.0

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank-wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16 0
Cleaners' naphtha	15 0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax or 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150-gallon lots if covered by contract.

Canada*

3 Star Imperial Gasoline
IMPERIAL OIL, LTD.

	Tank-wag.	Inc. tax	Kero. tank-wax.
Halifax, N. S.	24 0	8 0	18 5
St. John, N. B.	24 0	8 0	18.5
Montreal, Que.	21 0	6 0	17.5
Toronto, Ont.	22 0	6 0	17.0
Hamilton, Ont.	22 0	6 0	17.0
Winnipeg, Man.	27 5	7 0	20.7
Brandon, Man.	28 1	7 0	22.3
Regina, Sask.	27 0	7 0	22.0
Saskatoon, Sask.	29 8	7 0	24.9
Edmonton, Alta.	26 5	7 0	21.5
Calgary, Alta.	24 0	7 0	19.0
Vancouver, B. C.	23 0	7 0	23.0

*Imperial gallon used in Canada.

Divided dealers pay tank-wagon price. Discount to undivided dealers, 1 cent below tank-wagon price. In maritime provinces both divided and undivided dealers pay tank-wagon price.

Retail Price Changes

Standard Oil Co. of New Jersey February 23 reduced consumer tankcar and dealer gasoline .5 cent at all Virginia points.

Standard Oil Co. of Louisiana February 23 reduced consumer tankcar and dealer gasoline .5 cent in Bristol.

Continental Oil Co. February 16 reduced dealer gasoline .5 cent in Fort Smith.

New York Market

(Continued from Page 119)

lon, but there were reports of business at 5⅞ cents and even 5¾ cents in barges.

The anticipated upturn in export business on the Gulf Coast failed to reach appreciable proportions. There were two inquiries in the market for gasoline but buyers appeared to be in no rush about placing the business. One cargo of gas oil was sold for 4⅛ cents per gallon. The price was reported in the trade to represent approximately one-eighth of a cent per gallon bonus for ability of the refiner to meet diesel index of 51. Gas oil having diesel index of 47 or less is reported available at 4 cents per gallon.

Gasoline continues to drift into lower ground in the absence of spot buying. Shipments are satisfactory against contract for this season of the year, but traders are still cautious.

Prices of Refined Products

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of March 1, 1938

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
62 oct. and below	.03⅞	.04
63-66 octane	.04⅜	.04½
67-69 octane	.04⅝	.04⅞
70-72 octane (regular)	.04⅞	.05
60-62 400 grades:		
62 oct. and below	.03⅞	.04
63-66 octane	.04⅜	.04½
67-69 octane	.04⅝	.04⅞
70-72 octane (regular)	.04⅞	.05
64-66 375	.04½	.04¾
68-70 360	.04⅞	.05⅛

NORTH TEXAS—

U. S. Motor grades:		
62 octane and below		.04
63-66 octane	.04⅜	.04⅝
67-69 octane	.04⅝	.04⅞
70-72 octane (regular)	.04⅞	.05⅛
60-62 400	.03⅞	.04
64-66 375	.04½	.04¾

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)

U. S. Motor grades:		
62 octane and below	.04½	.04⅝
63-66 octane	.04⅝	.04¾
67-69 octane	.05	.05⅛
70-72 octane (regular)		.05½

ARKANSAS (Ark., N. La., Miss. del.)—

U. S. Motor grades:		
62 octane and below		.04½
67-69 octane	.05	.05⅛
70-72 octane (regular)	.05½	.05⅝

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
62 octane and below	.04	.04⅛
63-66 octane	.04⅜	.04⅝
67-69 octane	.04⅝	.04⅞
70-72 octane (regular)	.05	.05¼
60-62 400 grades:		
62 octane and below	.04	.04¼
63-66 octane	.04⅜	.04⅝
67-69 octane	.04⅝	.04⅞
70-72 octane (regular)	.05	.05¼
64-66 375	.04¾	.05
68-70 360	.05	.05¼

PENNSYLVANIA (Inland refineries)—

58-60 U. S. Motor:		
Below 60 octane	.04½	.04⅝
65 octane	.06	.06½
68-70 octane	.06½	.07

CALIFORNIA (domestic movement)—

54-58 U. S. Motor	.07	.08½
58-60 400, 65 oct. and higher	.08¼	.09¼

EAST COAST (Domestic)—

U. S. Motor, 60-64.9 octane:		
New York (Bayonne)		.06½
Philadelphia	.06½	.06¾
Boston	.06½	.06¾
Baltimore	.06½	.06¾
Charleston, S. C.	.07	.07¼
U. S. Motor, 65 and above:		
*New York (Bayonne)	.06¾	.07
Philadelphia	.06¾	.07
Boston	.06¾	.07
Baltimore	.07	.07¼
Charleston, S. C.	.07¼	.07½

*All grades of gasoline one-eighth to one-fourth cent less for barge shipments. New York harbor prices are for New York and New England delivery. Prices for New Jersey delivery one-fourth cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
Below 60 octane	.05	.05¼
60-64.9	.05¼	.05⅜
65 octane and higher	.05½	.05¾

Naphtha

PENNSYLVANIA (Inland refineries)—

52-56 450 (blending)	.04½	.04¾

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70		.02⅛
Grade 18-55	.02½	.02⅝

NORTH TEXAS—

Grade 26-70		.02
Grade 18-55	.02⅜	.02½

CALIFORNIA—

75-85 375-390	.06½	.07

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

Grade 26-70	.02⅜

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 i.b.p., 110 flash, 540-550 e.p.	.04⅛	.04¼
41-43 gr., 300-520 e.p., 110-125 flash, 500-520 e.p.	.04¼	.04⅜
46-48 gr., 210-230 i.b.p., 480 max. e.p.	.04⅝	.04¾

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

41-43	.04⅛	.04¼
42-44	.04¼	.04⅜

NORTH TEXAS—

41-43	.04⅛	.04¼

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

41-43	.04⅜	.04½

ARKANSAS (Ark., N. La., Miss. del.)—

41-43	.04½	.04⅝

PENNSYLVANIA (Inland refineries)—

45	.05¼	.05⅜
46	.05⅜	.05½
47	.05½	.05⅝

CHICAGO (Based on Group 3)—

41-43	.04⅛	.04⅜
42-44	.04⅜	.04⅝

CALIFORNIA (Pac. Coast market)—

38-43 high burning test	.05¼	.06¾

NEW YORK (Bayonne, N. J.)—

41-43		.05¾

***GULF COAST (domestic)—**

41-43	.04⅞	.05

*Barge price one-eighth cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

No. 1 prime white, 38-42	.04	.04⅛
No. 1 straw, 38-40	.03⅞	.04
No. 2 straw, 32-36	.03⅝	.03⅞
No. 2 dark, 32-36		.03⅝
No. 3 zero to 15, 28-32	.03⅜	.03⅝
No. 3, 15 and above, 28-32	.03	.03⅛

NORTH TEXAS—

No. 1 prime white, 38-42		.04
No. 1 straw, 38-40		.03⅞

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

No. 2, 32-36	.03⅝

ARKANSAS (Ark., N. La., Miss. del.)—

No. 2, 32-36	.03⅞	.04

CHICAGO (Based on Group 3)—

No. 1 prime white, 38-40	.04⅛	.04¼
No. 1 straw, 38-40	.04	.04⅛
No. 2 straw, 32-36	.03⅞	.04
No. 2 dark, 32-36	.03⅝	.03⅞
No. 3, zero to 15, 28-32	.03½	.03⅝
No. 3, 15 and above, 28-32	.03	.03⅛

NEW YORK (Bayonne, N. J.)—

*No. 1		.05¾
*No. 2		.04¾
*No. 4		.04¾

*Barge deliveries one-eighth to one-four cent under above tankcar price.

Gas Oil and Fuel Oil

(Gas oil per gal.; fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil	.02⅞	.03
No. 4, low cold test, 24-28	1.10	1.15
No. 4, 15 and above, 24-28	.90	.95
No. 5, low cold test, 18-22	.77½	.82½
Below 18 fuel oil, industrial	.62½	.67½

NORTH TEXAS—

U.G.I. gas oil	.02⅞	.03
No. 4, low cold test, 24-28	1.10	1.15
No. 5, low cold test, 18-22	.80	.85
Below 18 fuel oil, industrial	.62½	.67½

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

10-14 fuel oil, industrial	.80	.85

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.03	.03⅛
No. 4, low cold test, 24-28	1.10	1.15
No. 4, 15 and above, 24-28	.90	.95
No. 5, low cold test, 18-22	.77½	.85
No. 5, 15 and above, 18-22	.70	.80
No. 6, low cold test, 10-16	.70	.77½
No. 6, 15 and above, 10-16	.50	.60

PENNSYLVANIA (inland refineries)—

36-40	.04⅝	.04¾

CALIFORNIA

Los Angeles:		
30-40 gas oil, per bbl.	1.35	1.70
24 plus diesel, per bbl.	1.45	1.70
24 plus diesel (bunkers)	1.55	1.70
12-16 (bunkers at tidewater)	.90	1.00
10-16 (cargo lots)	.85	1.00
12-17 (tankcars)	.80	1.00
10-17 (high sulfur)	.65	.90
San Joaquin Valley:		
10-18 (tankcars)	.60	.85
24 plus diesel, per bbl.	1.40	1.70
San Francisco:		
24 plus diesel, per bbl.	1.55	1.70
24 plus diesel (bunkers)	1.60	1.70
10-16 (bunkers)	1.00	1.05

GULF COAST—

28-30 gas oil	.04⅛	.04¼
28-30 diesel (bunkers)		1.90
Bunkers (bulk cargoes)		.85
Bunker C (bunkers)	.90	1.05

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.04¾
28-30 diesel (lighterage 6¼c per bbl.)		2.10
28-30 diesel (tankcars)	.04¾	.05
Bunker C (to ocean-going ships in N. Y. harbor)		1.25
Industrial fuel (tankcars)	.04	.04¼

Lighterage charge 5c bbl. additional.

Bright and Steam Refined

OKLAHOMA (Group 3)—

Bright Stocks:		
190-200 D, 15-25		.19
150-160 D, 0-10		.16
150-160 D, 15-25		.15
150-160 E, 15-25		.14½
100-110 D, 0-10		.14½
Steam refined:		
631 green (treated)		.13½
600 dark green (untreated)		.05

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour test	.18½	.19½
15 pour test	.17½	.18½
20 pour test	.16½	.17½
25 pour test	.15½	.16½
Steam refined:		
600	.08½	.09
650	.10½	.11½
600 Pennsylvania flash	.11	.13
630 flash	.14	.15
600 Warren E filtered	.13	.14

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

Zero to 10 Cold Test:	
150-3	.09
180-3	.10
180-4	.09½
200-3	.10½
200-4	.10
250-3	.11½
250-4	.11
280-3	.12½
280-4	.12
300-3½	.13
400-3½	.14
100-2½ paraffin oil	.06
15-20 Cold Test:	
200-3	.10
200-4	.09½
250-3	.11
250-4	.10½
280-3	.12
280-4	.11½

GULF COAST—

Pale Oils:		
200-3	.07	.07⅛
300-3	.07½	.07¾
500-3½	.08½	.08¾
750-3½	.08⅝	.09¼
1,200-3½	.09½	.09¾
1,500-4	.09¾	.10
Red Oils:		
200-5-6	.07¼	.07½
300-5-6	.07¼	.07½
500-5-6	.08	.08½
750	.08¾	.09
1,200-5-6	.09¼	.09½

CALIFORNIA (moving to dom. market)—

Pale Oils:		
100-2½-3	.07¼	.08
200-2½-3	.07¼	.08
300-2½-3	.07¼	.08
400-3-4	.07¼	.08
450-3-4	.07¼	.08
550-3-4	.09	.11
600-3-4	.09	.11
Red Oils:		
200-4-5	.07¼	.08
300-5-6	.07¼	.08
350-5-6	.09¼	.11½
400-5-6	.09¼	.11½
450-5-6	.09¼	.11½
500-5-6	.09¼	.11½
600-5-6½	.09¼	.11½
700-6½ plus	.09¼	.11½
750-6½ plus	.09¼	.11½
900-6½ plus	.09¼	.11⅞

PENNSYLVANIA—

150 vis. at 70° F. color, 400-405 flash:		
Zero pour test	.17½	.18
10 pour test	.16½	.17
15 pour test	.16	.16½
25 pour test	.15	.15½
180 vis. at 70° F., 3 color:		
25 pour test	.16	.16½
200 vis. at 70° F., 3 color:		
Zero pour test	.20½	.21
10 pour test	.19½	.20
15 pour test	.19	.19½
25 pour test	.17	.17½

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (a.m.p.) w.c. scale	.02⅝	.02½

PENNSYLVANIA (Inland refineries)—

122-124 (a.m.p.) w.c. scale	.0210	.0220
124-126 (am.p.) w.c. scale	.0210	.0220

NEW YORK—

Wax in bags fully refined:		
122-125 (a.m.p.) wax		.0420
125-127 (a.m.p.) wax		.0435
128-130 (a.m.p.) wax		.0445
130-132 (a.m.p.) wax		.0455
133-135 (a.m.p.) wax		.0500
135-137 (a.m.p.) wax		.0515
124-126 (a.m.p.) w.s.	.0205	.0215
124-126 (a.m.p.) y.s.	.0200	.0210
Petrolatum in barrels, carload lots:		
Dark green	.02	.02⅛
Amber	.02⅜	.02½
Extra amber	.02⅝	.02¾
Lily white	.05⅛	.05¼
Snow white	.06⅛	.06¼
Cream	.04⅛	.04¼

Export Prices

GASOLINE

GULF COAST—

U. S. Motor	.04⅞	.05
60-62 400	.04⅞	.05
61-63 390	.05	.05⅛
64-66 375	.05	.05⅛

LOS ANGELES—

U. S. Motor grades:		
55-65 octane	.05½	.05¾
65-69 octane		.06
Above 69 octane		.06¼

KEROSENE

GULF COAST—

41-43 prime white	.04⅝	.04¾
41-43 water white	.04¾	.04⅞
44 water white	.04⅞	.05

LOS ANGELES—

41-43 water white	.05	.05¼

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.a.s. in bbls.)—

Cylinder Stocks:		
600 Warren E	.20½	.21
600 S.R. unfiltered	.16	.16½
630 S.R. unfiltered	.18	.18½
600 flash, S.R.	.18½	.19
630 flash, S.R.	.21½	.22
Bright Stocks:		
8 color	.23	.23½
6½ plus color in dilution	.22½	.23

NEUTRAL OIL

200-3 color	.24½	.25
150-3 color	.22½	.23

PARAFFIN WAX

NEW YORK (prices per pound)—

123-126 a.m.p.		.0375
125-127 a.m.p.		.0387
128-130 a.m.p.		.0412
133-135 a.m.p.		.0437
135-137 a.m.p.		.0455
Crude Scale:		
124-126 w.s.	.0205	.0215
124-126 y.s.	.0200	.0210

CRUDE OIL PRICES

Oklahoma, Kansas, North Central and East Central Texas

(Effective January 28, 1937)

East Texas (May 22, 1937)*	$1 35
Van, Tex.†	1 10
Camp Hill, Tex.	1 27
Cass County, Tex.‡	1 25
Talco	73
Altus and Tipton, Okla.§	1 20
Other fields (see gravity table).	

*All companies. †Humble Oil & Refining Co.; Pure Oil Co. ‡Texas Co. §Gulf Oil Co. Talco by Humble Oil & Refining Co.

West Texas

See gravity table.	
Pecos County*	$ .91
Pecos shallow†	.81

*Shell Petroleum Corp., Gulf Pipe Line Co. and Humble Oil & Refining Co. †Shell Petroleum Corp.

Rocky Mountain States

(Effective January 28, 1937)

Iles, Colo., light*	$1 18
Iles, Colo., heavy*	1 12
Greybull, Wyo.*	1 30
Torchlight, Wyo.*	1 30
Grass Creek, Wyo., light*†	1 30
Grass Creek, Wyo., heavy (Nov. 4, 1936)*†	.62
Hamilton Dome, Wyo. (Jan. 1, 1937)*	.67
Elk Basin, Wyo., light*†	1 30
Frannie, Wyo., heavy*	.62
Frannie, Wyo., light	.70
Hogback, N. M. (Jan. 28, 1937)*	1 33
Salt Creek, Dutton Creek and Midway, Wyo., take Stanolind's Oklahoma prices on a gravity basis.	
Big Muddy, Wyo.†‡	1 23
Rock Creek, Wyo.†	1 20½
Lea County, N. M. (see West Texas gravity table).	
Artesia, N. M. (Jan. 28, 1937)‡	.90
Maljamar, N. M. (Jan. 28, 1937)‡	.90
Canon City and Florence, Colo.	1 10
Lance Creek, Wyo.	97
Lander, Wyo. (Jan. 1, 1938)¶	51¼
Sunburst, Mont. (Nov. 16, 1937)†	.90
Cat Creek, Mont. (Jan. 1, 1938)‡	$1 30
Garland, Wyo. (Jan. 1, 1937)†	.50

*Stanolind Oil & Gas Co. †Ohio Oil Co. ‡Continental Oil Co. ¶Hudson Oil Co.

Southwest Texas

(Effective January 28, 1937)

Pettus	$1 37
Salt Flat, Darst Creek, Hilbig, Carroll, Clark, Zoboroski	1 09
Lytton Springs	1 12
Luling	1 00

Saxet and Taft take same gravity table as Gulf Coast.

North Louisiana and Arkansas

Smackover, all grades	$ .90
Tullos and Urania	1 02
El Dorado East field	.90
Union County, Ark.	.90
Ouachita County, Ark.	.90
Lisbon, La. (Dec. 13, 1937)*	.98

*Caddo Crude Oil Purchasing Co.

Gulf Coast

(Effective January 28, 1937)

Choctaw and Darrow, La. See note below	
Clay Creek, Tex.	$1 00
Garden Island, La.	1 37
Cleveland, Tex.	1 27
Hardin, Tex.	1 15
Lafitte, La.	1 24
Livingston, Tex.	1 27
Welsh, La.	.98
Tepetate (La.) (Jan. 28, 1937)	1 24

Duval, Jim Hogg, Webb and Zapata counties, Texas, and Heyser and Placedo fields take Mirando gravity prices. Jennings, La., 5 cents lower than Gulf Coast prices on each degree. Segno, Texas, takes Gulf Refining Co.'s Gulf Coast prices. Choctaw and Darrow, Louisiana, posted for first time by Standard Oil Co. of Louisiana, start below 21 degrees at 90 cents, with 3-cent differential up to 25 gravity, then 2-cent differential up to 40 and above, $1.36. Effective October 1, 1937, Stanolind Oil & Gas Co. in Evangeline, La., pays 92 cents for below 20 gravity, adding 2 cents for each degree upward to 40 and over, at $1.34.

Middle Western States

OHIO OIL CO.
(Effective January 28, 1937)

Lima	$1 00
Illinois	1 35
Princeton, Ind.	1 35
Midland, Mich. (Jan. 5, 1938)*	1 12
West Branch, Mich. (Dec. 29, 1937)†	.80
Buckeye (Jan. 8, 1938)	1 09½
Arenac, Mich. (Dec. 29, 1937)†	.80
Muskegon, Mich.	1 00
Eastern Kentucky:	
Big Sandy River	1 42
Kentucky River	1 50
Western Kentucky	1 40

*Posted by Pure Oil Co.
†McClanahan P. L. and Simrall.
Midland, Mich., price posted by Simrall Corp. and Pure Oil Co. includes Greendale, Porter, Beaverton, Crystal and equal grades. West Branch and Arenac by Simrall Corp. Eastern Kentucky crude purchased by Ashland Refining Co., Ashland, Ky. Buckeye posted by Simrall Corp. and Pure Oil Co.

Eastern States

TIDE WATER ASSOCIATED OIL CO.
(Effective December 1, 1937)

Bradford, Pa.	$2.20
Allegany, N. Y.	2.20

SOUTH PENN OIL CO.
(Effective December 1, 1937)

Pennsylvania Grade Oil in National Transit Lines (Bradford field)	2.20
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	1.88
Pennsylvania Grade Oil in Eureka Pipe Line lines	1.82
Pennsylvania Grade Oil in Buckeye Pipe Line lines	1.70
Corning Grade Oil in Buckeye Pipe Line Co.'s lines	1.27

PENNZOIL CO.
(Effective December 1, 1937)

Pennsylvania Grade Oil in National Transit Lines:	
Group A — Includes Cochran, Franklin, Hamilton and Doolittle districts.	2.15
Group B — Includes Tidioute district.	2.14
Group C — Includes Turkey and Tidioute districts.	2.13
Group D — Includes Bear Creek and Porkey districts.	2.12
Group E — Includes Eldeneau, Bull Creek, Rough Run, Carbon, Dipner, Bredlin, McJunkin, Jameson, Kenerdell, Emlenton, Tiona, Lacey and Kinzua districts.	2.10

PURE OIL CO.
(Effective December 1, 1937)

Cabin Creek, W. Va.	1.82
Bradford Hollow, W. Va.	1.82
Kelly Creek, W. Va.	1.82

Canada

Ontario (Sept. 9, 1933)*

Petrolia	$2.10
Oil Springs	2.17

TURNER VALLEY NAPHTHAS AND CRUDE OIL
(January 5, 1938, by Imperial Oil, Ltd.)

Clear naphtha and discolored naphtha, 65 gravity and higher	$2.14
Discolored naphtha and crude oil, 40-40.9 gravity	1.14
Increasing 2 cents for each degree gravity with top price for 64-64.9 gravity	1.62

These prices f.o.b. producers field tankage.

*Imperial Oil, Ltd.

Mexico

Heavy Mexican crude	$.95

*In U. S. currency, f.o.b. ship, based on January spot market transactions.

Crude Oil Price Changes

Hudson Oil Co. has posted a price of 51¼ cents per barrel for crude in the Lander, Wyoming, field, making the price effective January 1, 1938.

Rocky Mountain Runs

Production estimates for week ended February 28:

	Bbls.
WYOMING	
Salt Creek	16,840
Big Muddy	1,190
Badger Basin	230
Dallas Derby	570
Dutton Creek	50
Elk Basin	20
Frannie	1,580
Garland	1,760
Grass Creek	10
Hidden dome	160
Hudson	250
LaBarge	980
Lance Creek	12,060
Lost Soldier	1,360
Medicine Bow	3,630
Midway	30
Oregon	1,450
Osage	700
Pilot Butte	20
Quealy dome	820
Rex Lake	20
Rock River	2,900
South Casper	490
Poison Spider	280
Teapot	20
Warm Springs	20
Wertz	810
Waugh dome	170
Total Wyoming	48,430
MONTANA	
Border	60
Cat Creek	640
Cut Bank	7,300
Dry Creek	1,310
Kevin-Sunburst	3,500
Pondera	430
Total Montana	13,240
COLORADO	
Florence	90
Fort Collins and Wellington	330
Iles dome	2,400
Moffat	390
Orchard	30
Rangely	100
Tow Creek	150
Price	540
Total Colorado	4,030
NEW MEXICO	
Cooper	5,050
Eaves	980
Eunice	26,740
Hardy	1,650
Hobbs	16,020
Jal	1,280
Langlie	2,980
Lynch	630
Lynn	740
Mattix	2,570
Monument	28,080
North Lynch	50
Penrose	4,820
Rhoades	100
Skelly	1,910
South Eunice	2,600
Vacuum	500
Artesia-Maljamar	7,160
Getty	200
Hogback	200
Rattlesnake	740
Table Mesa	100
Total New Mexico	105,100
Total Rocky Mountain region	170,800

John R. Suman, vice president of the Humble Oil & Refining Co., Houston, Tex., and Mrs. Suman have returned from a visit to New York.

Crude Prices by Gravities

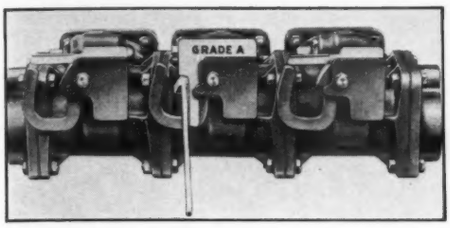
	Oklahoma-Kansas	Oklahoma-Kansas	North and Central Texas	East Central Texas (Mexia district)	North Louisiana-Arkansas	Gray County, Texas	Hutchinson-Carson counties, Texas	Rodessa, Louisiana-Texas and Panola County, Texas	Conroe, Tomball, Raccoon Bend, (Deep) Satsuma	Gulf Coast	Gulf Coast	Lea County, N. Mex. West Texas except Pecos County	Mirando district, Texas	Marion County, Texas	Refugio, Greta, Saxet, Taft, Texas	Anahuac, Flour Bluff, Dickson, Turtle Bay	White Castle, Louisiana	Iowa, Louisiana	Cayuga, Texas
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Bel. 18	....	....	....	....	....	....	....	....	....	$.90	....	....	....	....	....	....	....	$.90	....
18-18.9	....	....	....	....	....	....	....	....	....	.92	....	....	....	....	....	....	....	.92	....
19-19.9	....	....	....	....	....	....	....	....	....	.94	....	....	....	....	....	....	$.94	.94	....
20-20.9	....	....	....	....	....	....	....	....	....	.96	$.95	....	$.96	....	$1.01	....	.96	.96	....
21-21.9	....	....	....	....	....	....	....	....	....	.98	.98	....	.98	....	1.03	....	.98	.98	....
22-22.9	....	....	....	....	....	....	....	....	....	1.01	1.01	....	1.00	....	1.05	....	1.01	1.01	....
23-23.9	....	....	....	....	....	....	....	....	....	1.04	1.04	....	1.02	....	1.07	....	1.04	1.04	....
24-24.9	....	....	....	....	....	....	....	....	....	1.07	1.07	....	1.04	....	1.09	....	1.07	1.07	....
Bel. 25	....	$.98	....	....	$.90	....	....	$.93	....	....	....	....	....	$.90	....	....	....	....	$.88
25-25.9	....	1.00	....	....	.92	....	....	.95	....	1.10	1.10	$.78	1.06	.92	1.11	....	1.10	1.10	.90
26-26.9	....	1.02	....	....	.94	....	....	.97	....	1.13	1.13	.80	1.08	.94	1.13	....	1.13	1.13	.92
27-27.9	....	1.04	....	....	.96	....	....	.99	....	1.15	1.15	.82	1.10	.96	1.15	....	1.15	1.15	.94
28-28.9	....	1.06	....	....	.98	....	....	1.01	....	1.17	1.17	.84	1.12	.98	1.17	....	1.17	1.17	.96
Bel. 29	$1.06	....	$.96	$1.03	....	....	....	....	$1.20	....	....	....	....	....	....	....	....	....	....
29-29.9	1.08	1.08	.98	1.05	1.00	....	....	1.03	1.22	1.19	1.19	.86	1.14	1.00	1.19	....	1.19	1.19	.98
30-30.9	1.10	1.10	1.00	1.07	1.02	....	....	1.05	1.24	1.21	1.21	.88	1.16	1.02	1.21	$1.16	1.21	1.21	1.00
31-31.9	1.12	1.12	1.02	1.09	1.04	....	....	1.07	1.26	1.23	1.23	.90	1.18	1.04	1.23	1.18	1.23	1.23	1.02
32-32.9	1.14	1.14	1.04	1.11	1.06	....	....	1.09	1.28	1.25	1.25	.92	1.20	1.06	1.25	1.20	1.25	1.25	1.04
33-33.9	1.16	1.16	1.06	1.13	1.08	....	....	1.11	1.30	1.27	1.27	.94	1.22	1.08	1.27	1.22	1.27	1.27	1.06
34-34.9	1.18	1.18	1.08	1.15	1.10	....	....	1.13	1.32	1.29	1.29	.96	1.24	1.10	1.29	1.24	1.29	1.29	1.08
Bel. 35	....	....	....	....	....	$.96	$.91	....	....	....	....	....	....	....	....	....	....	....	....
35-35.9	1.20	1.20	1.10	1.17	1.12	.98	.93	1.15	1.34	....	1.31	.98	1.26	1.12	1.31	1.26	1.29	1.29	....
36-36.9	1.22	1.22	1.12	1.19	1.14	1.00	.95	1.17	1.36	....	1.33	1.00	1.28	1.14	1.33	1.28	1.29	1.29	....
37-37.9	1.24	1.24	1.14	1.21	1.16	1.02	.97	1.19	1.38	....	1.35	1.02	1.30	1.16	1.35	1.30	1.29	1.29	....
38-38.9	1.26	1.26	1.16	1.23	1.18	1.04	.99	1.21	1.40	....	1.37	1.04	1.32	1.18	1.37	1.32	1.29	1.29	....
39-39.9	1.28	1.28	1.18	1.25	1.20	1.06	1.01	1.23	1.42	....	1.39	1.06	1.34	1.20	1.39	1.34	1.29	1.29	....
40,over	1.30	1.30	1.20	1.27	1.22	1.08	1.03	1.25	1.44	....	1.41	1.08	1.36	1.22	1.41	1.36	1.29	1.29	....

Column 1—Companies posting are Barnsdall, Bell, Champlin, Continental, Cushing, Derby, Bay, Eason, El Dorado, Cities Service, Falcon, Globe, Gulf, Johnson, Kanotex, National, Phillips, White Eagle, Stanolind, Sunray, Texas, Sun Vickers and Wilcox.
Column 2—Anderson & Prichard, Carter, Cosco, Deep Rock, Magnolia, Mid-Continent, Pure, Rock Island, Shell, Sinclair, Skelly and Tide Water.
Column 3—All purchasers.
Column 4—Humble Oil & Refining Co. and Sinclair Oil Purchasing Co.
Columns 5, 6, 7 and 8—All purchasers.
Column 9—Humble Oil & Refining Co. and Sun Oil Co. Tidewater Oil Co.'s schedule starts at 35 degrees, $1.34 with 2-cent spread up to 40 and over at $1.44. (Raccoon Bend prices are for deep sand oil.)
Column 10—The Texas Co. (Gulf Refining Co. pays same prices up to and including 34 gravity, but continues its 2-cent spread up to 40 and over at $1.41.)
Column 11—Humble Oil & Refining Co., Sinclair Prairie Oil Marketing Co., Sun Oil Co.
Column 12—All purchasers.
Column 13—All purchasers (effective July 6, 1937).
Column 14—Magnolia Petroleum Co.
Column 15—Humble Oil & Refining Co. (effective July 6, 1937).
Column 16—Humble Oil & Refining Co.
Columns 17 and 18—Shell Petroleum Corp.
Column 19—Tide Water Oil Co.

New or Improved Equipment

Prevents False Measurements and Product Contamination

A new selector manifold for use on multicompartment tank-trucks has been announced by Ralph N. Brodie Co., Oakland, Calif. It is designed for gasoline or fuel-oil trucks having two or more compartments. An interesting automatic signal



arrangement "flags" the open line and shows the grade name of the product being delivered.

One purpose of the manifold is prevention of accidental opening of more than one compartment at a time. The device also saves space, as it takes the place of several compartment valves. On trucks with meters it prevents false measurements which sometimes result from drawing air from an empty compartment.

Use of the Brodie manifold simplifies piping arrangements and avoids the need for separate welded manifolds. Product contamination is avoided and the "flags" prevent confusion as well as meet legal requirements existing in certain districts. The manifold is also furnished without the "flags."

Noble Transferred to Alice

Ralph Noble, for the past 11 years sales and service man for the Lufkin Foundry & Machine Co., has been transferred to Alice, Tex., where he will be in charge of the company's office and warehouse at that point. Mr. Noble's experience in this type of work has taken him to practically all the oil fields in the Mid-Continent and Gulf Coast areas.

Here and There With Men Who Manufacture Equipment

M. E. Smith, advertising director of Chicago Bridge & Iron Co., has returned from a business and pleasure trip which took him to the company's plant in Birmingham, Ala., with stops at Orlando and Miami Beach, Fla., and Havana, Cuba. On the return trip points on the East Coast of the United States were visited and the final stop was in Cleveland, Ohio, to attend a convention.

The following 10 companies have been approved by the Eagle-Picher Sales Co. as distributors for the Eagle-Picher line of industrial insulating materials: Automatic Coal Burner Co., Beckley, W. Va.; Bemis Refractories Service Co., Springfield, Mass.; Corbett-Wallace Corp., Houston, Tex.; Joseph A. Coy Co., Tulsa; G. M. Hardware Co., Beaumont, Tex.; H. R. Kelly Co., Inc., Brooklyn, N. Y.; Fred H. McGee, Chattanooga, Tenn.; McLean-Peterson Co., Cincinnati, Ohio; United Brick & Tile Co., Oklahoma City, Okla.; United Engineering & Equipment Co., Nashville, Tenn.

Three executives associated with the industrial sales department of the Westinghouse Electric & Manufacturing Co. have been promoted: O. F. Stroman, manager of the department, to vice president in charge of sales; C. B. Stainback, assistant manager, to manager; Bernard Lester, a former assistant manager, to manager of a newly created resale department.

How valves and fittings give control over liquids and gases is shown in a sound picture entitled "Flow" released by Crane Co., Chicago. Rivers in flood, waterfalls, and then primitive means of controlling flow are followed in the picture by a tour through Crane's Chicago works where the steps in manufacturing with iron, brass and steel are revealed.

Twenty-six salesmen of the Macwhyte Co., Kenosha, Wis., manufacturer of wire rope and allied products, attended a three-day sales meeting at the home offices of the company.

Robert E. Kirn, vice president of C. Lee Cook Manufacturing Co., Inc., Louisville, Ky., and New York, is on a six weeks' business trip, visiting the company's offices on the West Coast and in the Mid-Continent.

The Tulsa Rig & Reel Co., Tulsa, has opened a branch in Electra, Tex., to serve the K.M.A. field and the North Texas area. Al Blubaugh is in charge.

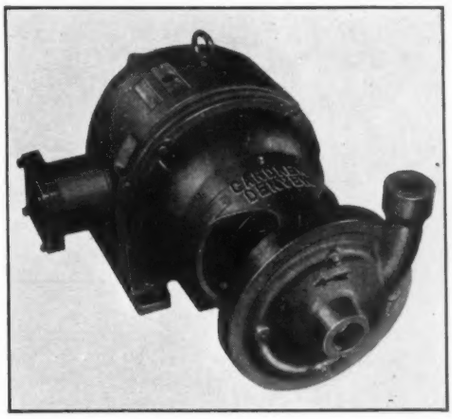
AXELSON MEN ON LINKS

Inaugurating the first of a series of semi-annual golf tournaments, members of the Axelson Manufacturing Co. sales department in Los Angeles, Calif., recently played the Rio Hondo course. The tournament, under the direction of R. M. Humphreys and Alvin Zwerneman, brought together all of Axelson's California store men and salesmen as well as executives of the company and members of the sales and order departments. Tied for first place were Alvin Zwerneman and Ray Conger. G. A. Axelson, J. C. Axelson and Abe Haglund were among the runners-up.

J. C. Axelson, A. Zwerneman, T. Rauworth, H. D. Collins, W. F. Goertz and H. S. Kelley

Close-Coupled Motor Pump Is Offered by Gardner-Denver

The Gardner-Denver Co., Quincy, Ill., announces a close-coupled centrifugal motor pump, designed for capacities up to 250 gallons per min-



ute and heads up to 250 feet at speeds of 1,750 and 3,460 revolutions per minute. The speed depends upon the required capacity and head. The new type H pump is said to meet the requirements of general service.

The pump is single-suction, having a single-stage enclosed impeller made of standard bronze. The pump and splashproof motor are mounted together to form a complete and compact unit. An adjustable bearing in the outboard end of the motor compensates for wear between the clearance spaces in the pump. Because no wearing-rings are needed in this type of construction, they have been eliminated, and the usual trouble of replacing them will not be experienced. All unnecessary parts are eliminated in the interests of economy and trouble-free operation.

The pump can be installed in any position; on the floor, on the wall or on the ceiling, and either horizontally or vertically. It is so compact that it may be used for portable and semi-portable as well as stationary operations.

Oil-Pruf Tire Made to Last

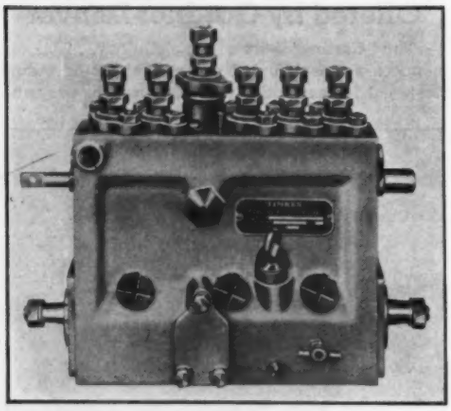
A new industrial tire, specially compounded to resist the action of animal, vegetable, and mineral oils, and to be known as the Oil-Pruf, is being introduced by the B. F. Goodrich Co., Akron, Ohio. When subjected to oils tires ordinarily disintegrate and become soft and spongy. Under such conditions they are susceptible to rapid tread wear, cutting, and chipping. Tests carried on for several years in steel mills and meat-packing plants are said to have shown these new tires retain their original physical properties approximately 30 per cent better. The Oil-Pruf tire should be of special value to companies operating industrial equipment over floors saturated with oils and greases.

Koppers Gets Manufacturing Rights

The Koppers Co., Pittsburgh, Pa., has acquired exclusive rights to the manufacture and sale of the valves and other waterworks and sewerage equipment formerly produced by the Michigan Valve and Foundry Division of the Timken-Detroit Axle Co. The line will be produced under its present trade name by Koppers Co.'s Western Gas Division, Fort Wayne, Ind.

Important Advantages Gained by Renewable Pumping Unit

Renewable pumping units having a plunger diameter range from 4 mm. to 9 mm., for use in Timken fuel injection pumps, are said to represent the latest advance in commercial fuel injection equipment. The units, which greatly simplify servicing in the field, are premetered at the factory,



thus eliminating any pump calibration or metering in the field at the time of installation. They can be installed in a few minutes. The operator can stock a spare service unit or set, thus avoiding loss of engine time or the expense of keeping a spare fuel injection pump on hand.

The Timken renewable pumping unit is a self-contained, accurately metered, precisely timed mechanism. It comprises, in a rigid, simple unit body, the barrel and plunger, the delivery-valve and the delivery-valve spring. It is held tightly in the injection-pump housing by means of two hexagon nuts threaded on two studs in the pump-housing, pressing against a flange on the upper end of the pumping-unit body. The pumping unit is positively aligned axially in the housing by the close fit in the housing-bore and by reason of one of the unit flange-holes being accurately slotted to bear tightly on two sides of one of the precisely placed dowel studs. Thus the unit must be correctly aligned to be inserted. The pumping unit slips easily into place and is tightened into the injection pump by means of the hexagon nuts until the unit flange seats firmly on a gasket against the flat top of the housing.

To assure calibration of one unit in relation to the other pumping units, the unit can be slipped into the housing only when it is so set that the pinion-gear on the upper metering sleeve will index the correct teeth in the control-rack rod of the injection pump.

Bulletins, Booklets and Other Literature for the Trade

Methods of salt-water disposal in the Talco field are the subject of an interesting article in the January-February issue of Hot Shots, published by Lane-Wells Co., Los Angeles, Calif.

An illustrated bulletin on steam jets, ejectors, tank outlets and spray nozzles has been issued by the Duriron Co., Dayton, Ohio. Capacity tables are given where applicable. A copyrighted chart simplifies selection of the correct size jet for heating any volume of liquid.

The Crosby vapor-tension gauge is the subject of a bulletin obtainable from Crosby Steam Gage & Valve Co., which has offices in New York, Boston and Chicago. The company is offering also reprints of the paper on "Measurement of Pressure," by Norman J. Smith, presented at the Oil World Exposition in Houston, Tex., in October, 1937.

A loose-leaf catalog of the Lonergan line of safety steam appliances for power plants is being mailed on request by J. E. Lonergan Co., 211 Race Street, Philadelphia, Pa. Among new items is the model WTN valve, made to various specifications to cover all the requirements of relief and pop safety valves.

Blaw-Knox Co., Pittsburgh, Pa., has appointed N. B. Ornitz president of the power piping division of the company, and W. N. Quartz, as vice president in charge of operations. Mr. Ornitz, a director and a vice president of Blaw-Knox, will continue management of the National Alloy Steel Division.

The many uses of molybdenum steel are enumerated in the current number of the Moly Matrix, published by Climax Molybdenum Co., 500 Fifth Avenue, New York.

D. W. Haering & Co., Inc., 3408 Monroe Street, Chicago, announces a 24-page booklet, "The Art of Proportioning," describing the operation, construction and application of H-O-H feeders operated by pressure difference between pitot tubes employing the Haering fluid piston principle.

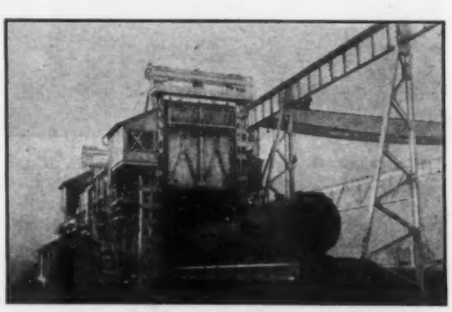
The Rex World, published by Chain Belt Co., Milwaukee, Wis., usually features applications of Rex chains and conveyors in various industries. but it departs from that practice in its newest number and shows attractive pictures of its own plant and operations.

"U. S. Royal Cords and Cables," an illustrated wire manual designed to provide electrical engineers, contractors, purchasing agents and others with wire and cable data and specifications, has been announced by the wire division, United States Rubber Products, Inc., 1790 Broadway, New York.

Packless, seamless, flexible metal hose and couplings are the subject of an illustrated booklet offered by Packless Metal Products Corp., 37 Twenty-ninth Street, Long Island City, N. Y.

Cooper Opens Branch in Longview

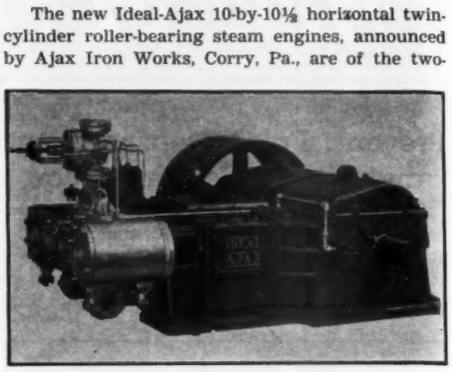
With the opening of a new branch in Longview, Tex., the Fred E. Cooper organization, Tulsa, has again increased the facilities for sales and service on Allis-Chalmers power units and well-servicing equipment for the oil industry. The new branch is at 322 East Tyler Street, where Allis-Chalmers pumping power engines, high-speed winch tractors, and skid winches will be shown. Fred E. Cooper also maintains a factory branch in Los Angeles, Calif.



This bubble-tower 7 by 57 feet, was fabricated by Chicago Bridge & Iron Co. in Birmingham, Ala., for the Phillips Petroleum Co. plant in Judkins, Tex. It is of welded construction, with all joints X-rayed and the entire vessel stress-relieved.

Ideal-Ajax Engines Made for Hard and Long Service

The new Ideal-Ajax 10-by-10½ horizontal twin-cylinder roller-bearing steam engines, announced by Ajax Iron Works, Corry, Pa., are of the two-



throw, center-crank type with bored crosshead guides and with crankshaft running in tapered roller bearings. They are designed to run at moderate and high speeds and built for heavy-duty, continuous service. They are compact and rugged, with fully enclosed frame and self-contained lubricating system.

Great savings in steam consumption, fuel, and water can be effected, the manufacturers say, by using this engine in connection with an Ideal C-350 power slushpump, for which the engine is particularly designed. When the engine is intended for driving a power pump, it usually is furnished without reversing mechanism. However, double-throw eccentrics are provided, the same as furnished with reversing-type engines, so that the engine can be changed easily into a reversing type for other power-drive applications. This change can be made in the field and requires only a few new parts.

These engines are mounted on the extended skids of the power pumps and form a self-contained unit, handled easily in the field.

The pump-drive engines are regularly furnished to run "under" in order to give the proper rotation to the pump pinion-shaft. The shaft is extended through both ends of the frame and the driving-sheave or chain-sprocket may be placed on either the right or left side. The shaft and bearings are of sufficient size and capacity to withstand the severe pulls encountered with slushpump drives. "V" belts afford efficient, quiet and compact means of transmission between the engine and pump.

Power pumps operated by the Ideal-Ajax twin-cylinder engines can be run at any desired speeds and the engines will "stall" against a heavy overload, which could be caused by a plugged bit or any restricted circulation. This feature is regarded as of special value.

Manages Subsurface Equipment

In keeping with a program calling for expansion of the parts and service facilities for pumping equipment in 55 branch stores of the Continental Supply Co., the appointment of R. B. (Bob) Stanbery as manager of the subsurface equipment division is announced. Long identified with the oil industry, Mr. Stanbery has been a special representative for Continental since 1935. Previously he was associated with the D & B Pump & Supply Co., Los Angeles, manufacturer of pumping equipment for Continental. In this capacity Mr. Stanbery was instrumental in the development of equipment to pump from present deep horizons. His early experience was with the Frick-Reid Supply Corp. in Ohio and the Superior Oil Corp. in California.

Multiservice Hoist Does Many Jobs Around the Oil Lease

The Harnischfeger Corp., Milwaukee, Wis., presents to the construction and maintenance field the P&H multiservice crawler hoist. Pro-

vided with three hoisting drums, the hoist combines in one machine unusually high lifting capacity with the drawbar pull and mobility of a tractor from which it is possible to work off either side or over the front end.

With three forward travel speeds ranging from 1.3 m.p.h. in low gear to 5.2 m.p.h. in high, this machine gives tractor mobility to meet all ground conditions whether the job calls for climbing steep hills or traveling through soft, swampy areas. It has a ground pressure of only 7.6 pounds per square inch. Its live boom is quickly adjusted up and down, enabling the hoist to adapt itself to a wide variety of work, handle it easily, maneuver smoothly and perform many tasks that might otherwise require several machines.

Some of the jobs for which the P&H multiservice crawler hoist is recommended are pipe-handling, backfilling trenches and general utility lifting and moving work in the oil fields. With its novel drum hoist arrangement, it is also valuable for switching freight cars around industrial plants, hoisting platform elevators on construction jobs, general utility machine around steel erection jobs or for handling dry material for underwater digging with flat line cableways.

Improved Permochart Announced

The success of Permochart, a renewable chart for recording meters introduced to the industrial field a year ago, is being duplicated by a new and improved Permochart now manufactured by Permochart Co., Koppers Building, Pittsburgh, Pa. The new Permochart has been made harder and stronger, resulting in a better writing surface which produces a cleaner pen line and adds greatly to its life and utility. Production facilities have been enlarged and thousands of designs and sizes are now available so that charts to meet almost every requirement may be shipped promptly. Each day's recordings are quickly removed by the use of a damp cloth and the same chart is used over and over again. Its life in ordinary service is guaranteed at two years.

Marmon-Herrington Changing Fords to All-Wheel Drive

The Marmon-Herrington Co., Indianapolis, Ind., now offers a complete line of passenger and commercial cars with power and traction on all wheels. The company converts all standard Ford passenger cars, commercial and light delivery models, to all-wheel-drive, in addition to the larger Ford trucks, truck-tractors, etc. The company also builds a complete line of heavy-duty all-wheel-drive vehicles of great power and tractive ability.

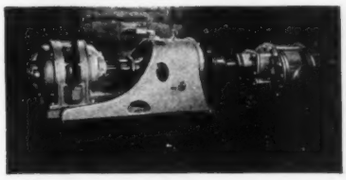
These Marmon-Herrington all-wheel-drive Ford passenger and commercial cars have the flexibility, speed, and easy steering of standard Fords, combined with traction on all wheels, and take sharp curves at high speeds. They will cling to slippery, icy roads and plough through deep sand or mud.

Stahl Made Chief Engineer

Emsco Derrick & Equipment Co. has appointed L. W. Stahl chief engineer of its Houston machinery division, with headquarters in Houston, Tex. Mr. Stahl first became connected with the Emsco organization early in 1937, and during the past year has been head of a new department, created for the development of rotary drilling equipment, at the home office in Los Angeles. He is a graduate of the University of California school of mechanical engineering, and has been connected with major manufacturing organizations closely affiliated with the oil industry.

Liquids of Varying Viscosities Are Handled by This Pump

A compact pumping unit for bulk transfer service where both thin and highly viscous liquids are handled has been developed by the



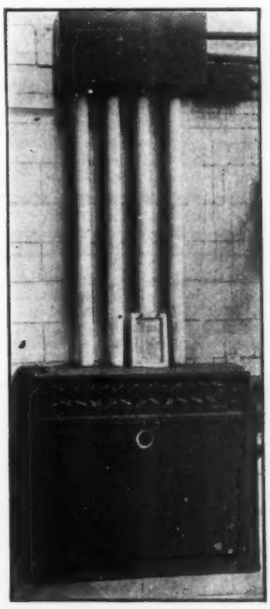
Worthington Pump & Machinery Corp., Harrison, N. J. The pump is of the herringbone-gear-impeller type driven by a constant-speed motor or internal combustion engine through a two-speed, enclosed transmission. For light liquids the pump may be operated at high speed, and for viscous liquids the speed may be reduced. In either case the full power of the prime mover is employed.

In conventional applications of single pumping units on such service, motors are selected for the heaviest loads and they are operated at a fraction of their rated power when pumping the thinner liquids. The new two-speed unit affords maximum efficiency because a relatively small constant-speed driver is used.

The manufacturer states that various applications of these units have proved satisfactory, owing to the self-priming high-suction qualities and positive displacement features in the pump. There are no valves to retard the liquid flow, and the entire unit requires little space.

Corrosion Avoided by Keeping Switches Immersed in Oil

The corrosive atmospheres in oil refineries and chemical plants generally are "bad medicine" for electrical apparatus. In such plants the cost of repairing switches and lighting circuits, and of replacing fuses is high. One way of avoiding corrosion difficulties is to keep the atmospheres from reaching switch mechanisms, that is by submerging the switches in oil. Panelboards using AB No-fuze breakers are now available for this service. The development has centered around provision of a new type of thermal tripping element that will have the proper characteristics when operating under oil. These breakers can be used in a variety of forms — one, two, or three poles, and with ratings of 15 to 50 amperes, 250 volts, alternating current and up to 24 poles in a single tank. By using a deeper tank to provide a greater depth of oil these Westinghouse switches can be used in areas containing explosive atmospheres.



The illustration shows an installation in a large chemical plant of a 24-circuit, oil-immersed Westinghouse lighting panelboard using 24 single-pole, 20-ampere AB breakers.

FIVE SIZES ARE IN DISPLAY OF OILBATH GEARED POWERS

A striking display at the Dallas, Tex., office of Oil Well Supply Co. features five sizes of oilbath geared powers, all of the same general design. The oil-field ratings at 20 s.p.m. are 30, 50, 80,

100 and 150 horsepower with Lewis formula industrial ratings of 106, 172, 240, 385 and 510 horsepower respectively.

The "Oilwell" name is associated with important developments in this class of equipment. In 1930 the company constructed the first fully enclosed, roller-bearing, double-reduction gear driven power. This unit was rated at 80 horsepower for oil-field service. Two larger and two smaller powers were added to provide economical sizes.

The general advantages of modern enclosed geared powers are now well known. Stationary-spindle construction is a distinctive feature of all sizes in the "Oilwell" line. It provides direct transfer of side pull to the base and foundation and permits most favorable bearing spacing between the crankpin and the upper spindle-bearing and also between the upper and lower spindle-bearings.

Oil Man's Calendar

March

7—Rochester, N. Y., American Society for Testing Materials, Spring Regional Meeting and Group Committee Meetings.

14-16—Toronto, Ontario, annual meeting of Canadian Institute of Mining and Metallurgy.

15-17—New Orleans, La., annual meeting, Society of Exploration Geophysicists, Roosevelt Hotel.

16-18—New Orleans, twenty-third annual meeting, American Association of Petroleum Geologists, Roosevelt Hotel.

21-22—Oklahoma City, Oklahoma Utilities Association.

21-22—St. Louis, Mo., Liquefied Petroleum Gas Association, annual meeting.

22-23—Sioux Falls, S. D., annual convention, South Dakota Independent Oil Men's Association, Cataract Hotel.

21-25—Los Angeles, Calif., American Society for Metals congress and exposition, Pan-Pacific Auditorium.

23-25—Los Angeles, Calif., American Society of Mechanical Engineers.

24-25—Fort Worth, Tex., American Petroleum Institute, Division of Production, spring meeting, southwestern district, Blackstone Hotel.

April

4-6—Cincinnati, Ohio, A.G.A. Distribution Conference, Netherland Plaza.

13-15—Cleveland, Ohio, National Petroleum Association.

13-15—Houston, Tex., Petroleum Industry Electrical Association.

14-15—Pittsburgh, Pa., Eastern District A.P.I. Division of Production, William Penn Hotel.

17-21—Dallas, Tex., American Chemical Society.

19—Los Angeles, Spring meeting, Pacific Coast district, A.P.I. Division of Production, Biltmore Hotel.

19-21—Norman, Okla., Gas Measurement Short Course.

20-22—Buffalo, N. Y., American Institute Mining and Metallurgical Engineers, Open Hearth Conference.

25-27—Hot Springs, Ark., Western Petroleum Refiners Association, annual meeting.

May

9-12—New Orleans, La., Natural Gas Department, A.G.A.

11-13—Tulsa, Natural Gasoline Association, Hotel Tulsa.

12-14—Tulsa, National Oil Scouts Association of America.

14-21—Tulsa, International Petroleum Exposition.

23-25—Wichita, Kans., American Petroleum Institute, eighth midyear meeting.

27-28—State College, Pa., seventh annual conference, School of Mineral Industries, Pennsylvania Grade Crude Oil Association and Pennsylvania Natural Gas Men's Association.

June

4—Robinson, Ill., sixth annual Petroleum Conference of Illinois-Indiana.

6—Houston, Tex., Oil Workers International Union.

16-18—Pittsburgh, Pa., Pennsylvania Grade Crude Oil Association.

20-24—St. Louis, Mo., American Society of Mechanical Engineers.

June-July

27-1—Atlantic City, N. J., annual meeting of American Society for Testing Materials.

August-September

31-3—Spokane, Wash., Pacific Coast meeting of American Institute of Electrical Engineers.

September

14-16—Santa Barbara, Calif., annual meeting Pacific Coast Gas Association, Biltmore Hotel.

October

——Tulsa, I.P.A.A., annual convention.

6-8—Knoxville, Tenn., fall meeting of industrial minerals division of American Institute of Mining and Metallurgical Engineers.

10-14—Chicago, National Safety Congress, Stevens Hotel.

CLASSIFIED ADVERTISING

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PATENT LAWYER

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PATENTS — TRADE MARKS

All cases submitted given personal attention by members of the firm.
Form "Evidence of Conception" and instructions
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Business Opportunities

TULSA'S OLDEST commercial testing laboratory, specializing in oil, for sale, due to owner's death. Address Box J-270, The Oil and Gas Journal, Tulsa, Okla.

NOTICE TO MFGR. Want 16 patented articles mfg. & sold on royalty basis. P. O. Box 142, Tulsa, Oklahoma.

WANTED—Money to build refinery and casinghead plant in Miller Co., Ark. 1200 barrels daily production and 15,000,000 cubic feet wet gas. Will require $75,000 to dismantle, move and reerect the two plants on properties in Miller Co., including a cracking unit of 3,000 barrel capacity. Have ready market for all products. Reply to G.C.H., P. O. Box 313, Rodessa, Louisiana.

For Sale—Maps

1938 REVISED EDITION
MAP of State of Texas, Eastern N. M., parts of Southern Okla., SW Ark. and La., shows Oil and Gas Fields in color, Counties, County Seats, elevations, coordinated alphabetical index of counties and fields.
Price $1.00 postpaid

Write for descriptive folder of Oilfield and County Ownership Maps.

ZINGERY OIL MAP COMPANY
Fair Building Fort Worth

Situations Wanted

POSITION WANTED by draftsman, refinery and general engineering experience. Now employed. Address Box J-253, The Oil and Gas Journal, Tulsa, Okla.

Mechanical Engineer, Field Service or Shop Superintendent. Thoroughly experienced drilling and pumping machinery, mechanical rigs, diesel engines and gas engines. Desires increased responsibility. Address Box J-282, The Oil and Gas Journal, Tulsa, Oklahoma.

Help Wanted

REPRESENTATIVE to sell annealed and X-rayed tanks and towers, also heat exchanger equipment in Mid-Continent area. Commission basis only. Apply giving reference and past experience. Address Box J-281, The Oil and Gas Journal, Tulsa, Oklahoma.

Royalties

⅞ Royalty Deeds, Canadian Anticline Territory, Mora County, New Mexico. Information furnished. Martinez-Romero Oil Co., Inc., 2912 Lawrence St., Denver, Colorado.

Oil Royalties and Oil and Gas Leases
Bought and Sold
E. T. Marion
1109 Petroleum Building
Midland, Texas

Producing and Non-Producing
OIL ROYALTIES
Registered Dealers Only
GRIMES ROYALTY CO.
Hunt Bldg. Tulsa, Okla

OFFER—Undivided 3,000 acres in Jim Hogg County, Texas. 1600 Pecos County, Texas. 1/64th of 1/8th land. royalty. J. P. Stouppas, 38 So. Watt St., Youngstown, Ohio.

Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

7 A. ROYALTY of my ⅛ Undv. int. land not leased. SE¼ S., 1, T. 10 R. 1W. Cleveland Co., Okla., $350. Helen Anderson, 425 Ry. Ex. Bl., Portland, Ore.

PRODUCING OIL ROYALTIES
15 years of experience.
L. H. WITWER
214 Kennedy Bldg., Tulsa, Okla.

NEW MEXICO Oil and Gas Leases and royalties. Send 50 cents in stamps for new State Oil Map of New Mexico. Roy G. Barton, Clovis, New Mexico.

Brokers—Salesmen

Sell in the most active area in the United States—The Permian Basin of West Texas and Southeastern New Mexico. From the standpoint of royalty investors this area has much to offer. Can supply you with choice non-producing royalties located on geophysical highs. Also drilling blocks, close in acreage to production, or wildcat leases. I maintain my own field men who cover this area for me. All offerings meet the requirements of the Security and Exchange Commission. Inquiries invited.

B. D. BUCKLEY

Paul Brown Bldg., St. Louis, Mo.

ROYALTIES PURCHASING TRUST, LTD., Moorgate Hall, Moorgate London, E. C. 2., England, are buyers of producing oil royalties.

Crude Oil Production

RODESSA CRUDE OIL, 43 gravity, paraffin base for sale from my own and other Miller County, Arkansas, wells delivered on Tankers at Good Hope (New Orleans), La. See my representative, O. E. Hodge, Carondelet Building, New Orleans. William Monroe Layton, Rodessa, Louisiana.

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Classified Display is set with a border and may be used in one or two column sizes.

1 Inch	*1 time*	*$5.00*
1 Inch	*13 times*	*4.50 per inch*
1 Inch	*26 times*	*4.00 per inch*
1 Inch	*52 times*	*3.50 per inch*

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

CLASSIFIED

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgement is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times
3 Lines	*$1.05*	*$1.80*	*$2.55*	*$3.30*
4 Lines	*1.40*	*2.40*	*3.40*	*4.40*
5 Lines	*1.75*	*3.00*	*4.25*	*5.50*
6 Lines	*2.10*	*3.60*	*5.10*	*6.60*
7 Lines	*$2.45*	*$4.20*	*$5.95*	*$7.70*
8 Lines	*2.80*	*4.80*	*6.80*	*8.80*
9 Lines	*3.15*	*5.40*	*7.65*	*9.90*
10 Lines	*3.50*	*6.00*	*8.50*	*11.00*

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma